



1540 & 1541 + C

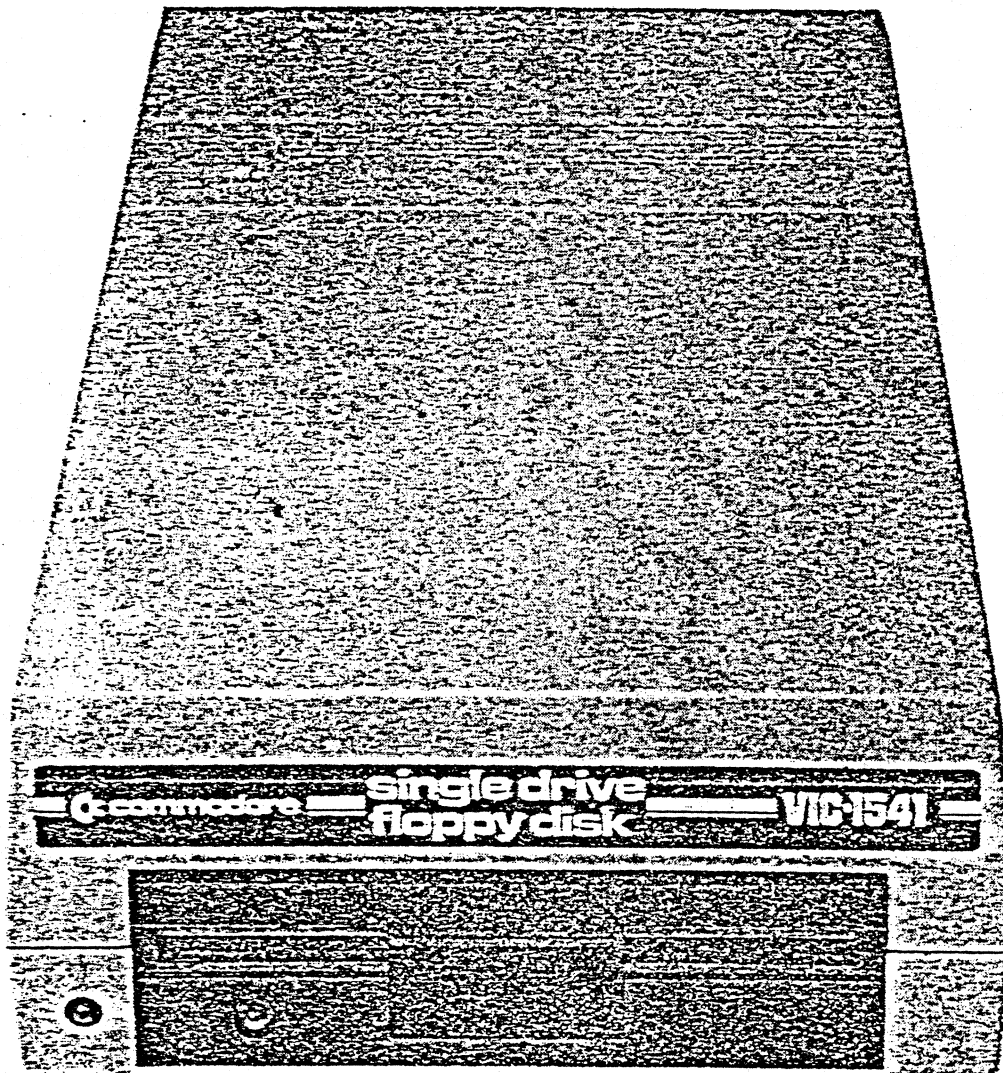


1540 & 1541 + C

Commodore Single Disk Drive

Technical Manual

Model 1540



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Chapter One

1.1 Scope

In this chapter, a description is made of the procedures necessary for servicing the Model 1540/1541 Floppy Disk Drive.

1.2 Unpacking

Special care should be exercised during unpacking not to damage the unit.

Unpacking procedures are as follows:

- a) Remove cardboard sleeve from styro-foam box
- b) Open 'styro-foam' box and remove drive
- c) Check the drives front door for proper operation

```
*****
*                                     *
*                               Caution                               *
*                                     *
*   Do Not Use Magnetized Tools   *
*                                     *
*****
```

1.3 Protection against noise

A weak signal from the media is detected in the head section of the drive. Hence, do not install the drive near a TV set or other areas where electromagnetic noise is generated. (i.e. motors, air-conditioners, etc)

1.7 Input/Output Cable

The length of the cable between the host and the drive (between the host and the last drive when the drives are daisy chained) should not exceed 5 meters (16 feet).

1.8 DC power source

The drive is powered by a internal power supply providing the drive with +12V and +5V.

1.9 Initial inspection

The drive can be briefly inspected for its operation by the following procedure. Install the drive, connect the power and I/O cables. Turn drive on and make sure the front panel power lamp is on. Proceed to step 2.2.

1.10 Outline of functions

The 1540/1541 Minifloppy Disk Drive mechanism is composed of the data read/write head, track positioning mechanism, spindle drive mechanism and eject mechanism.

1.11 Read/Write Head

The Read/Write head uses a glass-bonded, ferrite/ceramic head. Track-to-track erasing is accomplished by the straddle erase method. The surface of the Read/Write head is mirror-ground to minimize wear of the head and media. Also, the head is designed in such a way that the maximum signal can be obtained from the media surface.

1.12 Track positioning mechanism

Positioning of the Read/Write Head is accomplished by a stepping motor and steel belt. The stepping motor rotates clockwise or counter-clockwise by two steps per track. The control circuit on the logic board selects the direction and number of step to the desired track.

1.13 Spindle drive mechanism

The spindle drive motor operates on 12 VDC and turns the spindle, through a belt drive, at 300 revolutions per minute. The speed of the drive motor is controlled by a feedback signal from a tachometer which is housed in the drive motor assembly. The feedback signal controls a servo amp that supplies the 12 VDC drive current.

1.14 Eject mechanism

When the media is inserted in the Disk Drive and the door is closed the media is clamped by the spindle and hub. At this time the ejector mechanism is loaded by the insertion of the disk and locked. When the door is opened, the ejector mechanism is unlocked and the media pops out of the door.

Chapter Two

2.1 Mechanism Explanation

The 1540/1541 mechanism is installed in the system horizontally, however the drive will function if mounted vertically. The mechanical parts of the drive include an aluminum chassis, a stepping motor, head positioning assembly, drive motor, a hub and spindle assembly for centering and retaining the media during operation. The magnetic head is of a glass ceramic construction.

2.2 Function explanation

The drive is itself an independent memory device. The drive is composed of a media clamp rotating mechanism, ahead positioning mechanism and an eject mechanism. When the front door opens, the media can be inserted. All positioning operation excluding insertion and removal of the media are controlled by the internal guide mechanism. Closing the front door causes the media clamp mechanism to operate. Two operations are performed in the following order:

- a) The media is centered.
- b) The media is clamped and retained between the spindle and the hub.

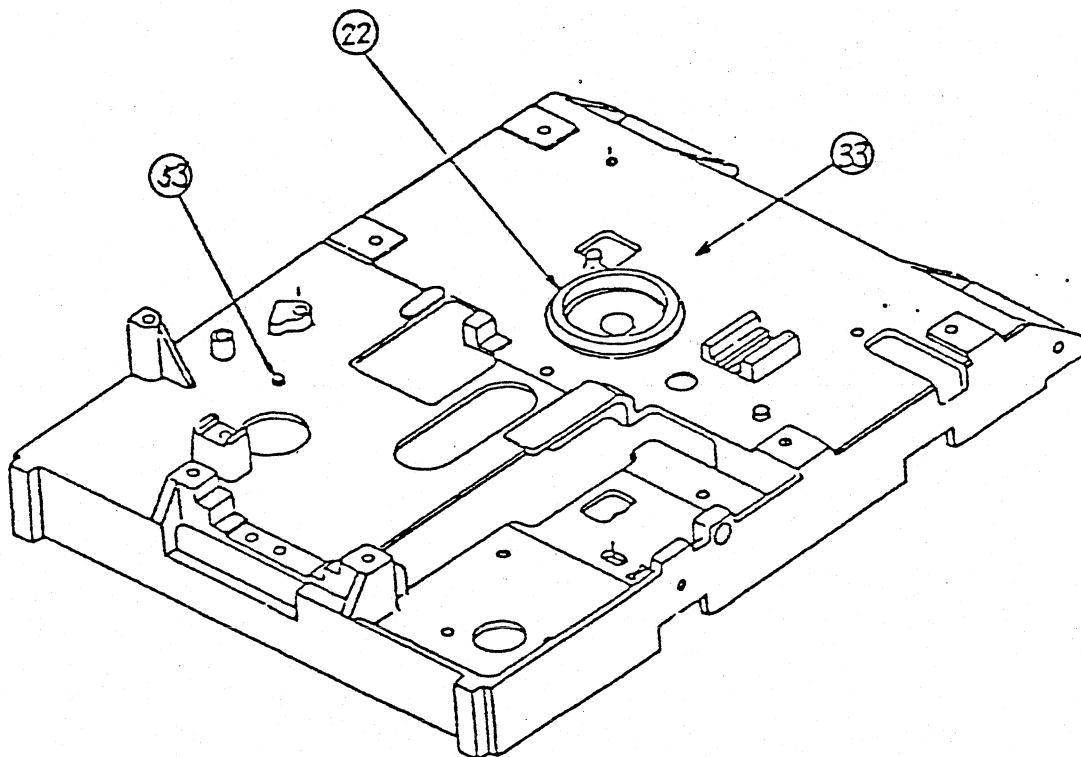
The spindle and hub rotate at 300 r.p.m. through a closed-loop control circuit employing a D.C. motor/tachometer. It is important that the relationship between the head and the media is maintained correctly during operation. For this purpose, a pressure pad is used to hold and press down the media (about 12g) from the opposite side of the head, to maintain the correct contact with the head. This head assembly is coupled by a metal band to a four phase stepping motor the performs the track positioning. One step of the stepping motor corresponds to a 1/2 track movement. Use of a high-speed stepping motor and metal band drive, this series of disk drives can perform access operations at a very high speed.

2.3 Assembly procedure

- 2.3.1 The housing assembly; install the eject pin and the spindle.
- 2.3.2 The housing assembly; on the reverse side install the spindle pulley.

2.3.3 FIG 1, The housing unit.

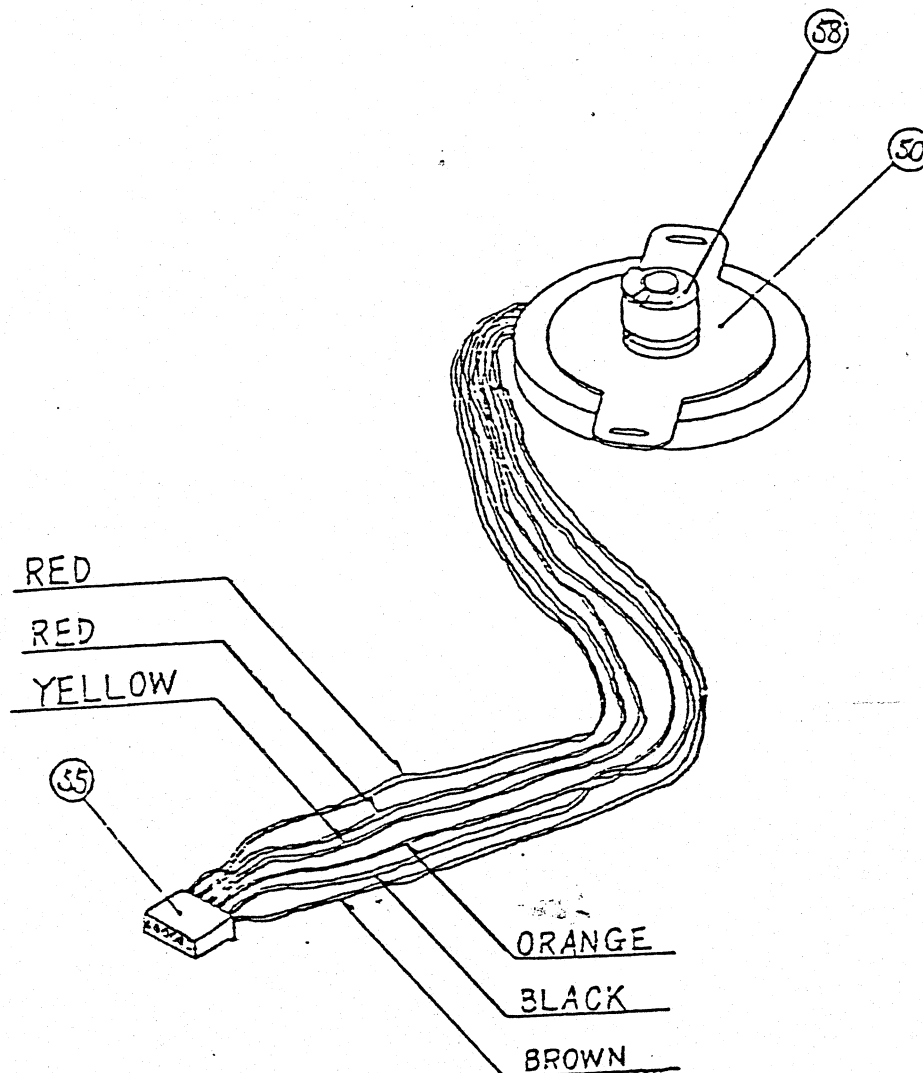
Part	Description
22	spindle
33	housing assembly.
53	eject pin



2.3.4 The stepping motor assembly; install the stepping pulley.

2.3.5 FIG 2, The stepping motor unit

Part	Description
50	stepping motor assembly
55	connector housing
58	stepper pulley



2.3.6 The D.C. motor assembly; install the motor pulley.

2.3.7 FIG 3, D.C. motor and control PCB

Part	Description
44	motor control PCB
48	D.C. motor
51	connector housing
59	D.C. motor pulley

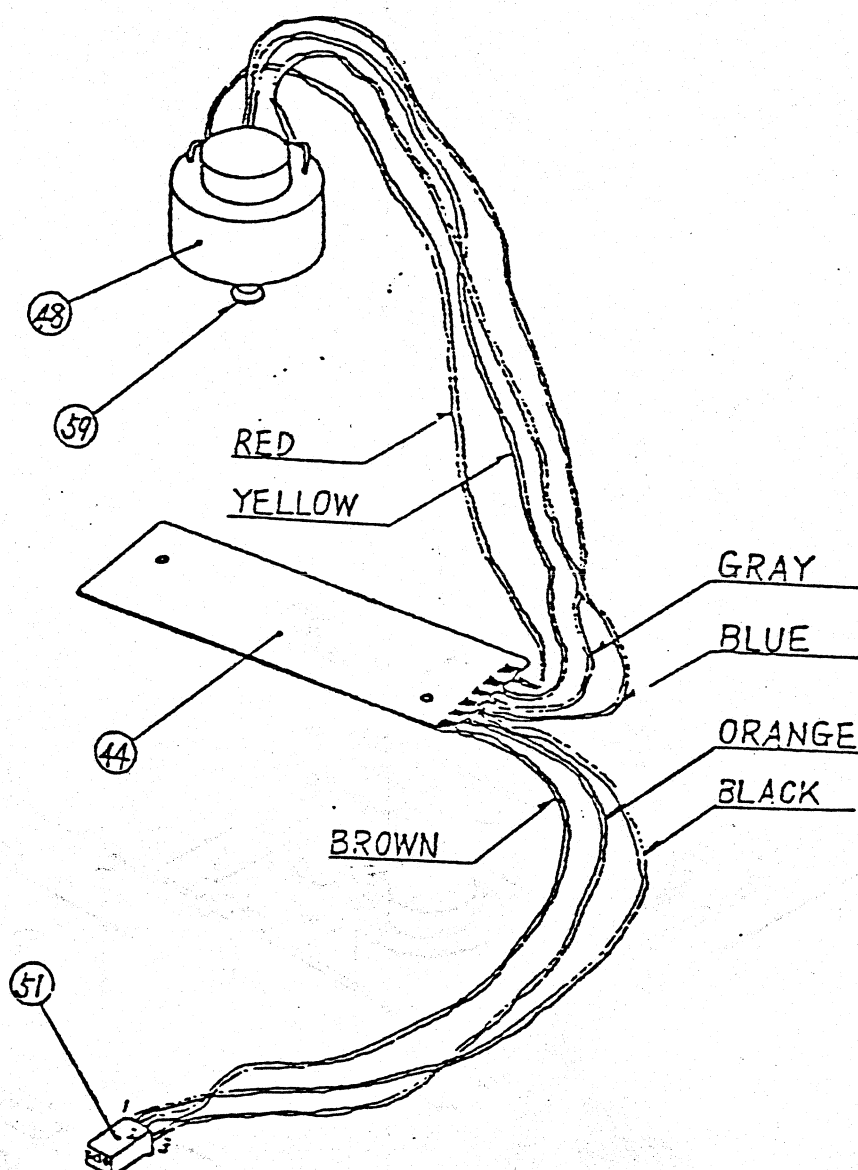


FIG. 6

Part	Description	Part	Description
20	binder screw	37	washer
21	diskette guide	38	eject spring
28	LED clamp	39	eject plate
29	front panel	40	slider
30	Flush screw	43	diskette guide
31	LED assembly	52	connector housing
32	LED holder ring		

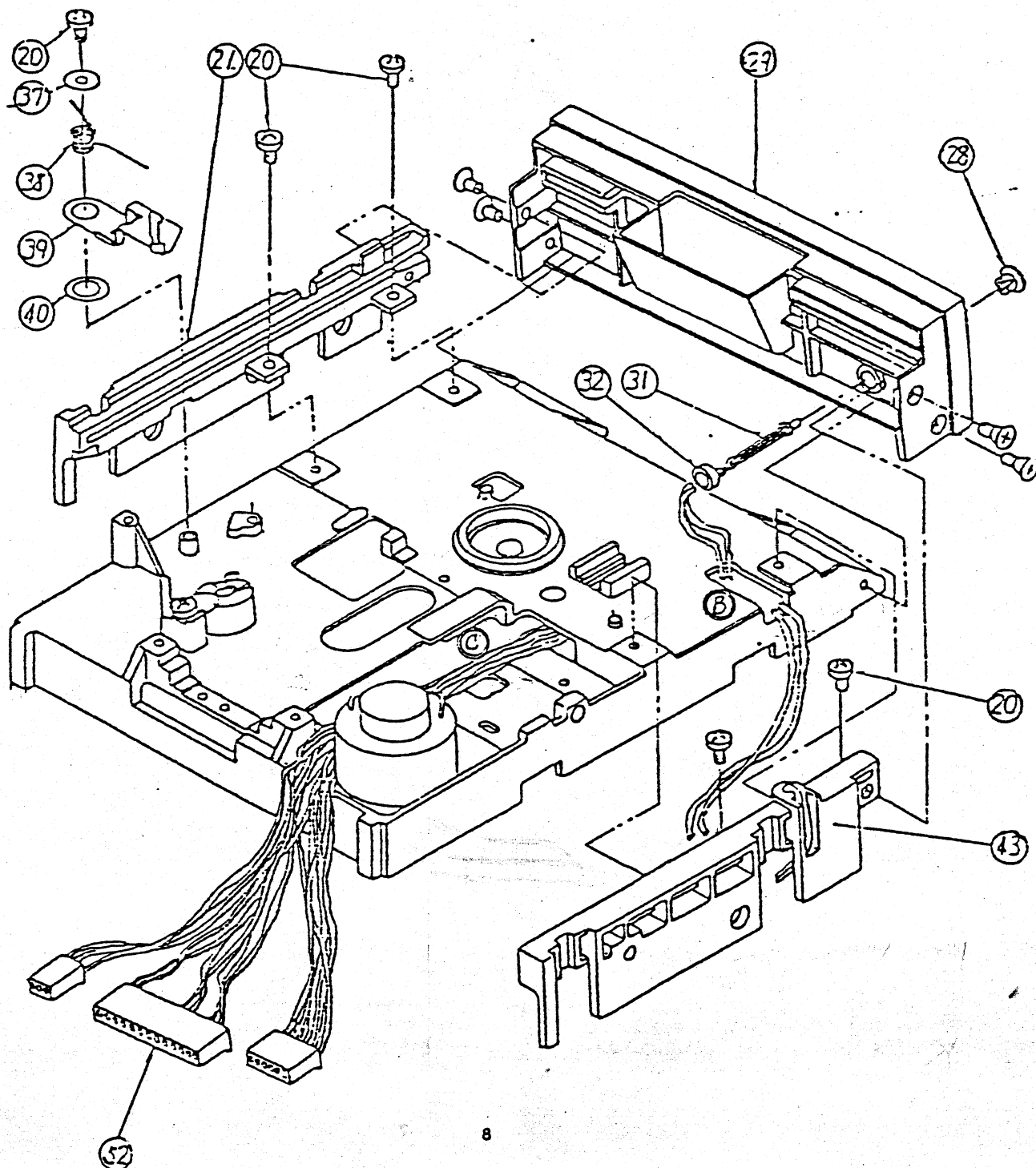


FIG 7.

Part	Description
------	-------------

- | | |
|----|--------------------|
| 15 | binder screw |
| 18 | binder screw |
| 24 | tension pulley |
| 25 | guide shaft keeper |
| 26 | guide shaft |
| 34 | metal band |
| 35 | washer |
| 36 | head assembly |
| 56 | tension spring |

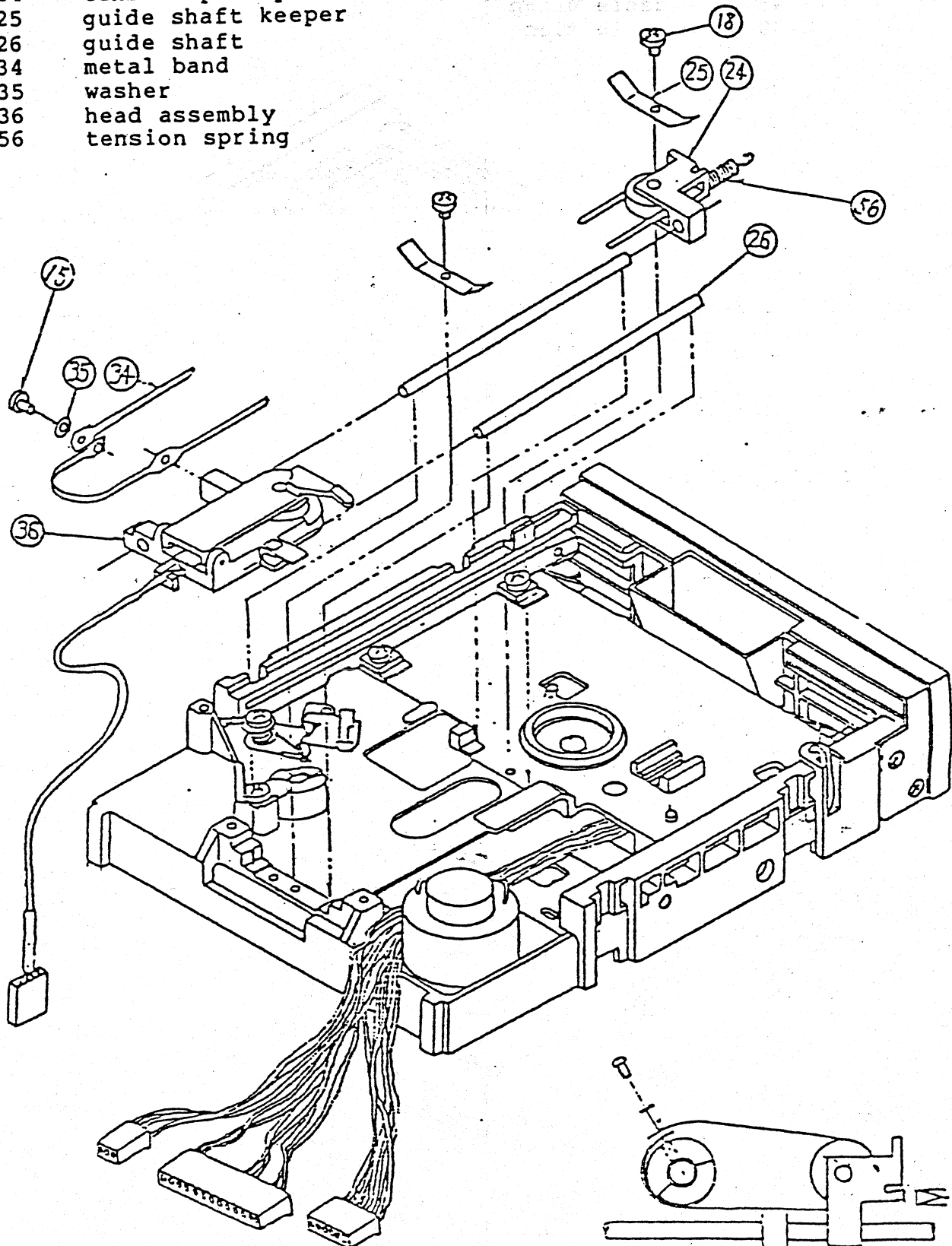


FIG 8

Part	Description
20	binder screw
45	cable clamp
49	cable ties

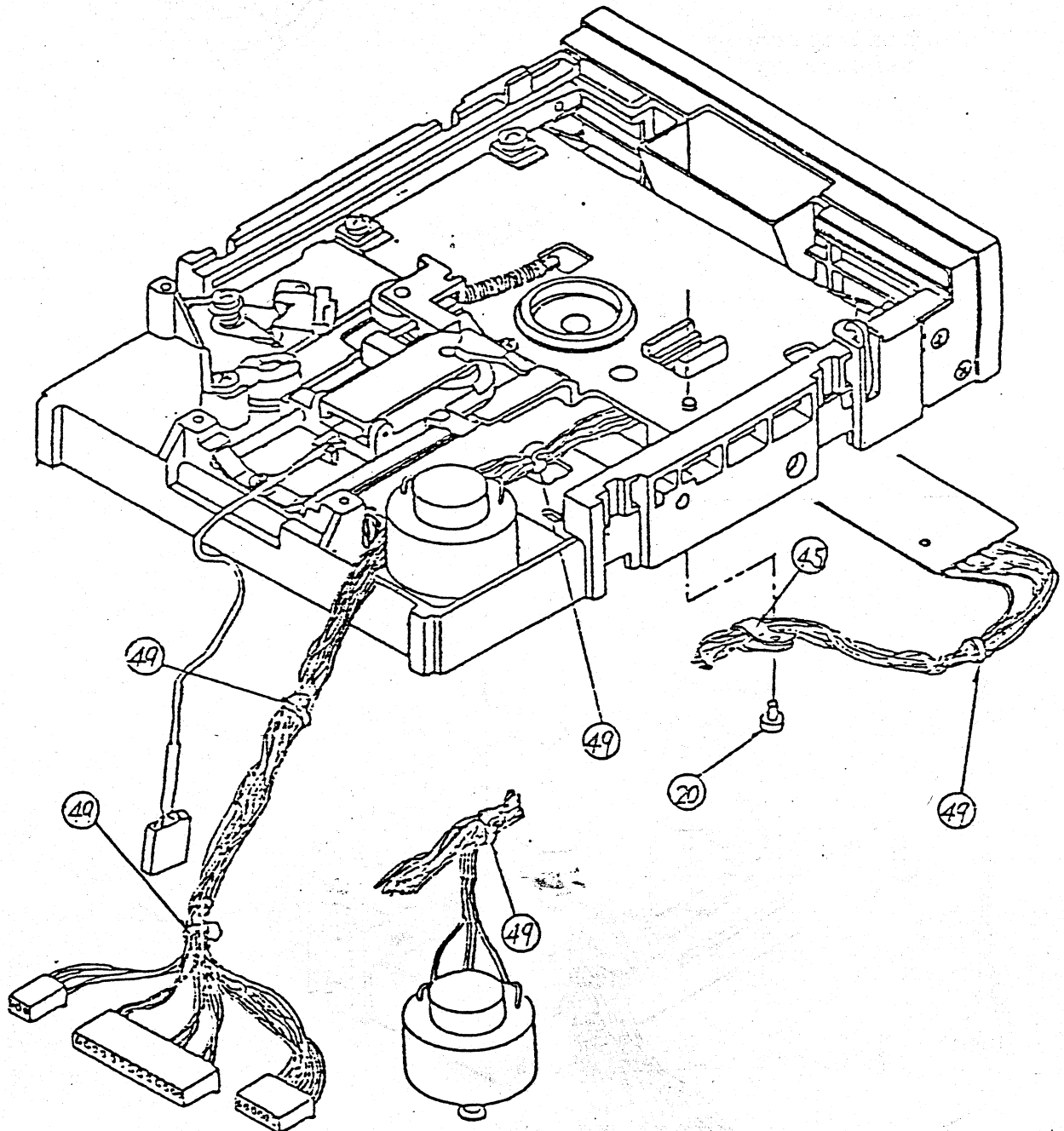
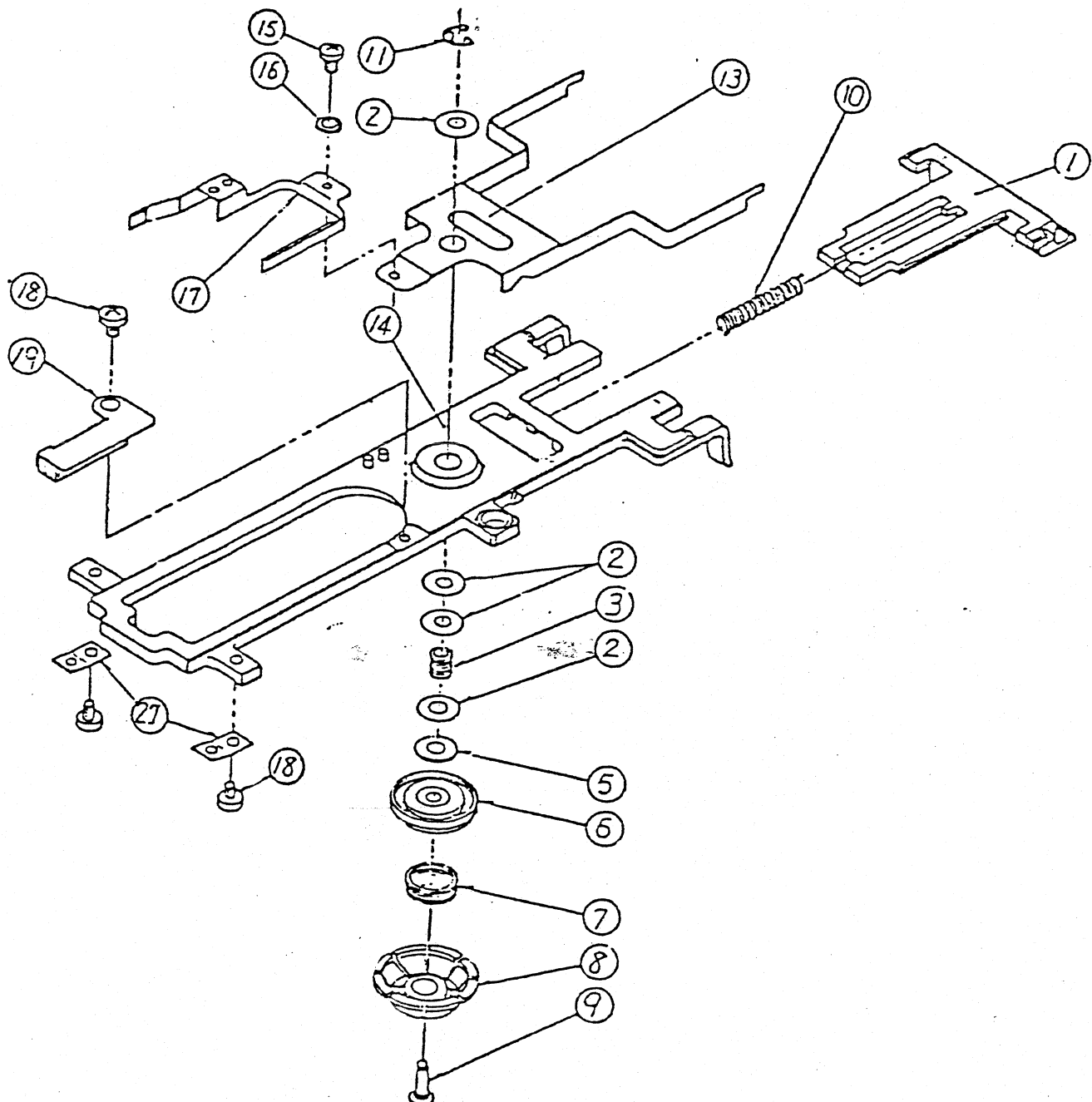


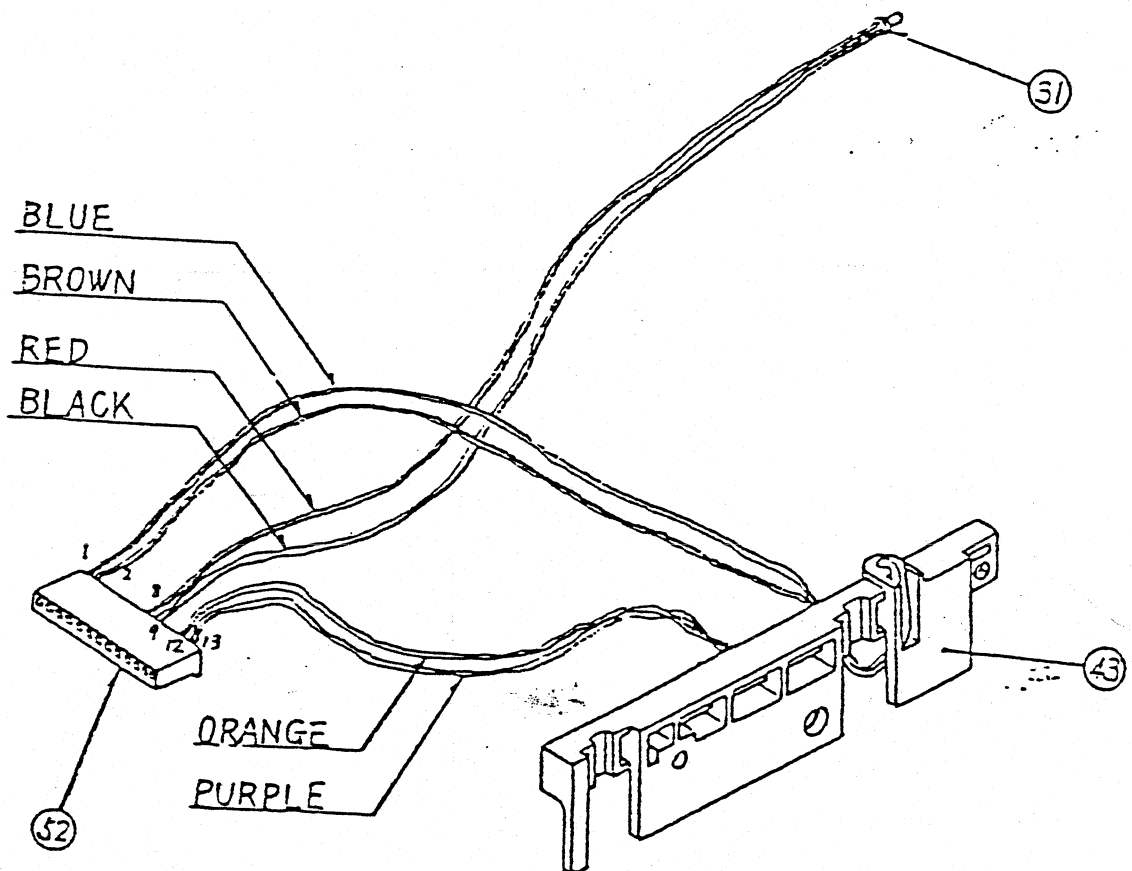
FIG 9

Part	Description	Part	Description
1	door assembly	13	hub support
2	collar	14	hub frame
3	clamp spring	15	binder screw
5	thrust washer	16	spring washer
6	collet assembly	17	arm support assembly
7	hub spring	18	binder screw
8	hub	19	pad plate assembly
9	hub shaft	27	hinge spring
10	door spring	60	collet
11	E-washer	61	collet bearing



2.3.8 FIG. 4, Diskette guide, LED assembly and connector housing.

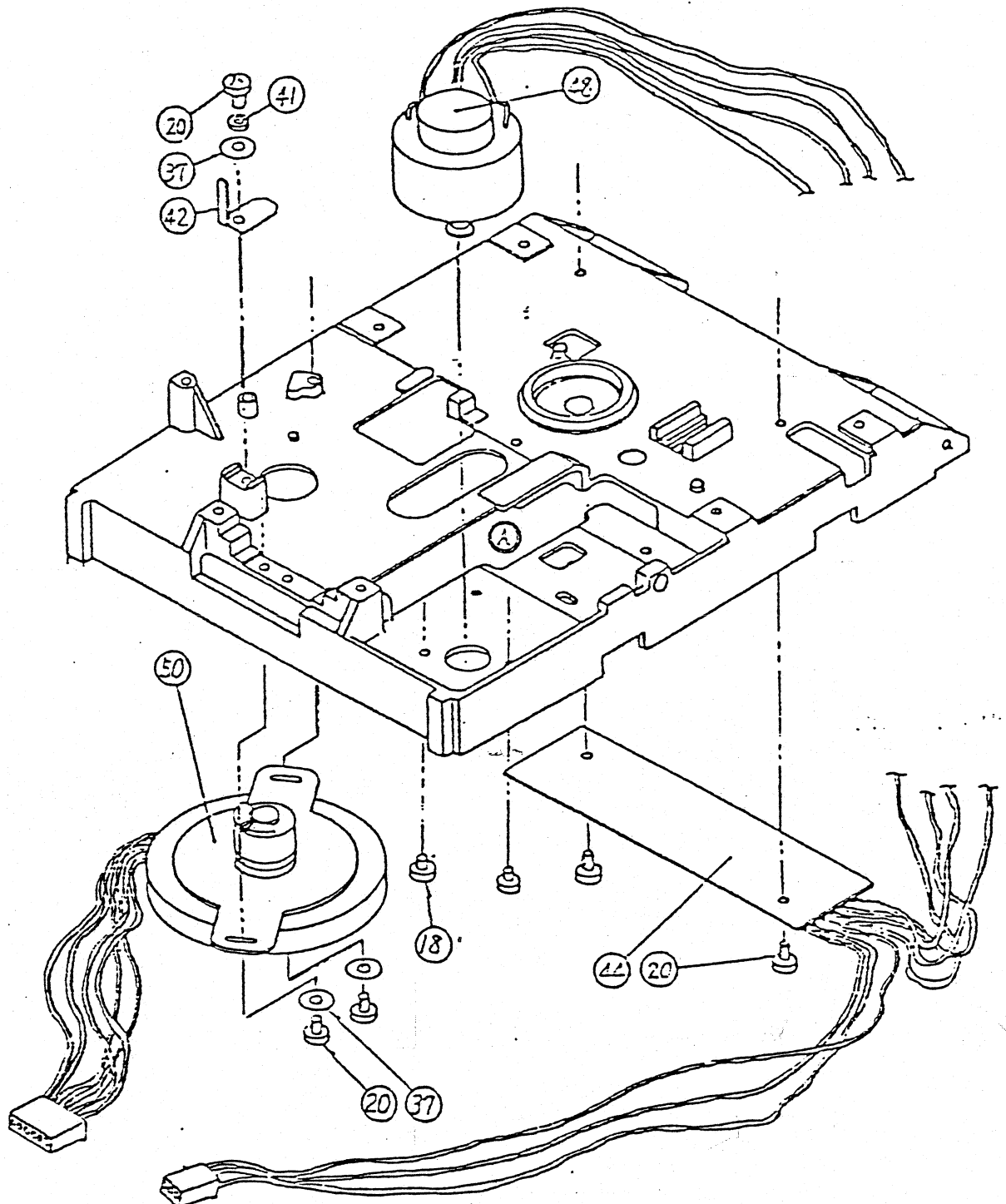
Part	Description
31	LED assembly
43	diskette guide
52	connector housing



- 2.3.9 Secure the D.C. motor from the reverse side of the housing assembly with two screws.
- 2.3.10 Put the motor control PCB into hole 'A' and secure it with two screws.
- 2.3.11 Secure the stepping motor with two screws.
- 2.3.12 Secure the carriage stopper with a screw.
- 2.3.13 Install the connector housing '52' into the hole 'B' and remove through hole 'C'.
- 2.3.14 Secure the two diskette guides '21' and '43' with two screws each.
- 2.3.15 Install the LED holder in the front panel.
- 2.3.16 Insert the LED assembly into the LED holder ring.
- 2.3.17 Install the led into the LED holder, then push the LED holder ring onto the LED holder.
- 2.3.18 Attach the front panel with four flush screws.
- 2.3.19 Secure the eject plate with a screw.
- 2.3.20 Wind the metal band around the tension pulley.
- 2.3.21 Insert the guide shafts into the head assembly. Install the tension pullet as shown in figure 8
- 2.3.22 Secure the guide shaft keepers by two screws each.
- 2.3.23 Wind the metal band around the stepper pulley and secure it with a screw to the stepper motor pulley.
- 2.3.24 Hook the spring to the tension pulley and install unit in the slot in the housing assembly.
- 2.3.25 Hook the opposite end of the spring to the housing assembly.
- 2.3.26 Fasten cable ties to the cables.
- 2.3.27 Secure the cable clamp with a screw as shown in FIG 8.
- 2.3.28 Secure the arm support assembly with a screw to the hub support.
- 2.3.29 Insert the hub shaft into the hub, the hub spring, the collet assy, the thrust washer, the collar, the clamp spring and two collars.
- 2.3.30 Insert the hub shaft into the frame and the hub support and fasten it at the E-washer.
- 2.3.31 Set the door assembly and the door spring at the hub frame.
- 2.3.32 Secure the pad plate assembly with a screw to the frame at the location shown in FIG 9
- 2.3.33 Secure the two hinge springs with two screws each.

FIG. 5

Part	Description
18	binder screw
20	binder screw
37	washer
41	spring washer
42	carriage stopper
44	motor control PCB
50	stepping motor assembly

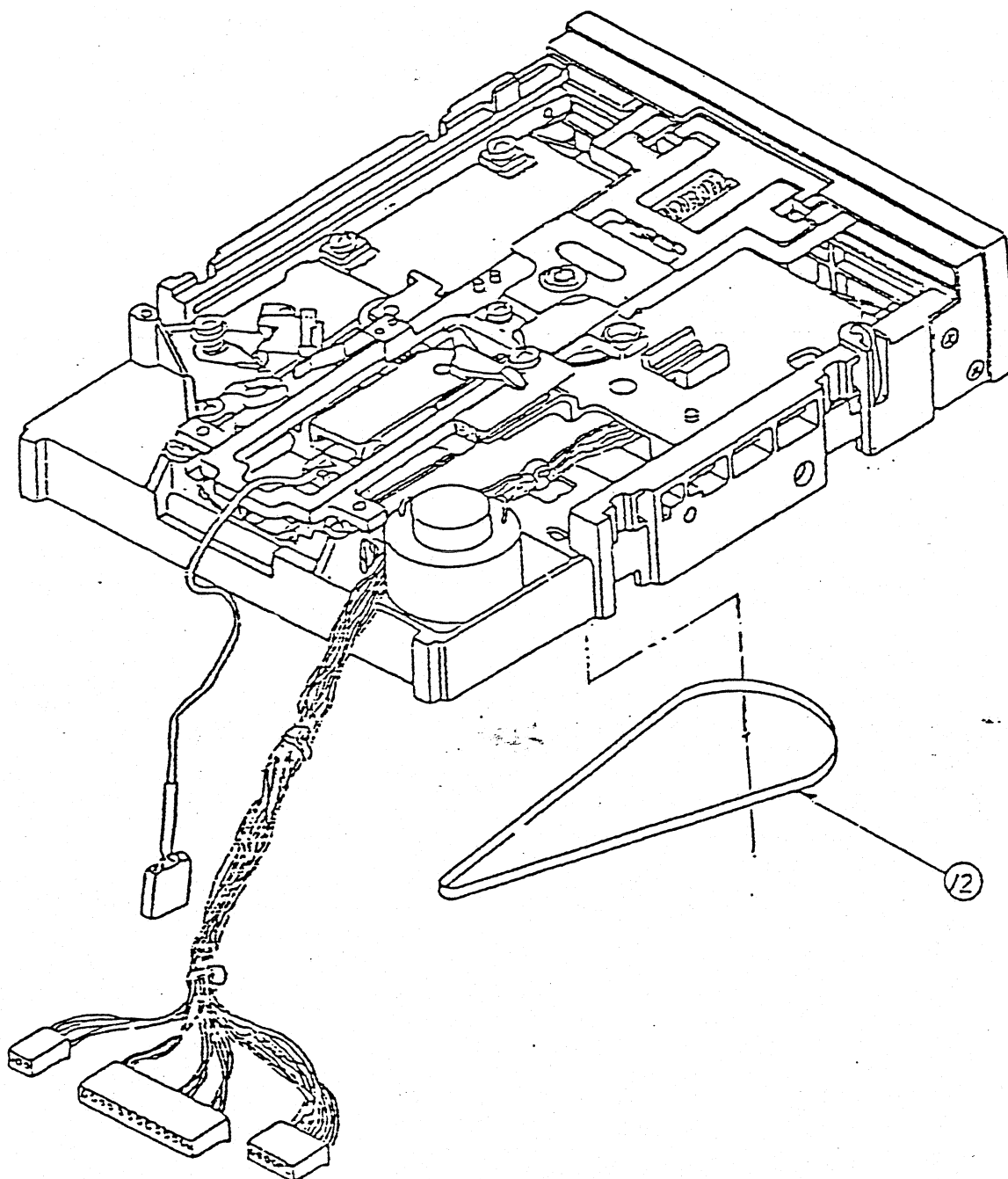


2.3.36 Place the belt over the D.C. motor pulley and partially on the spindle pulley.

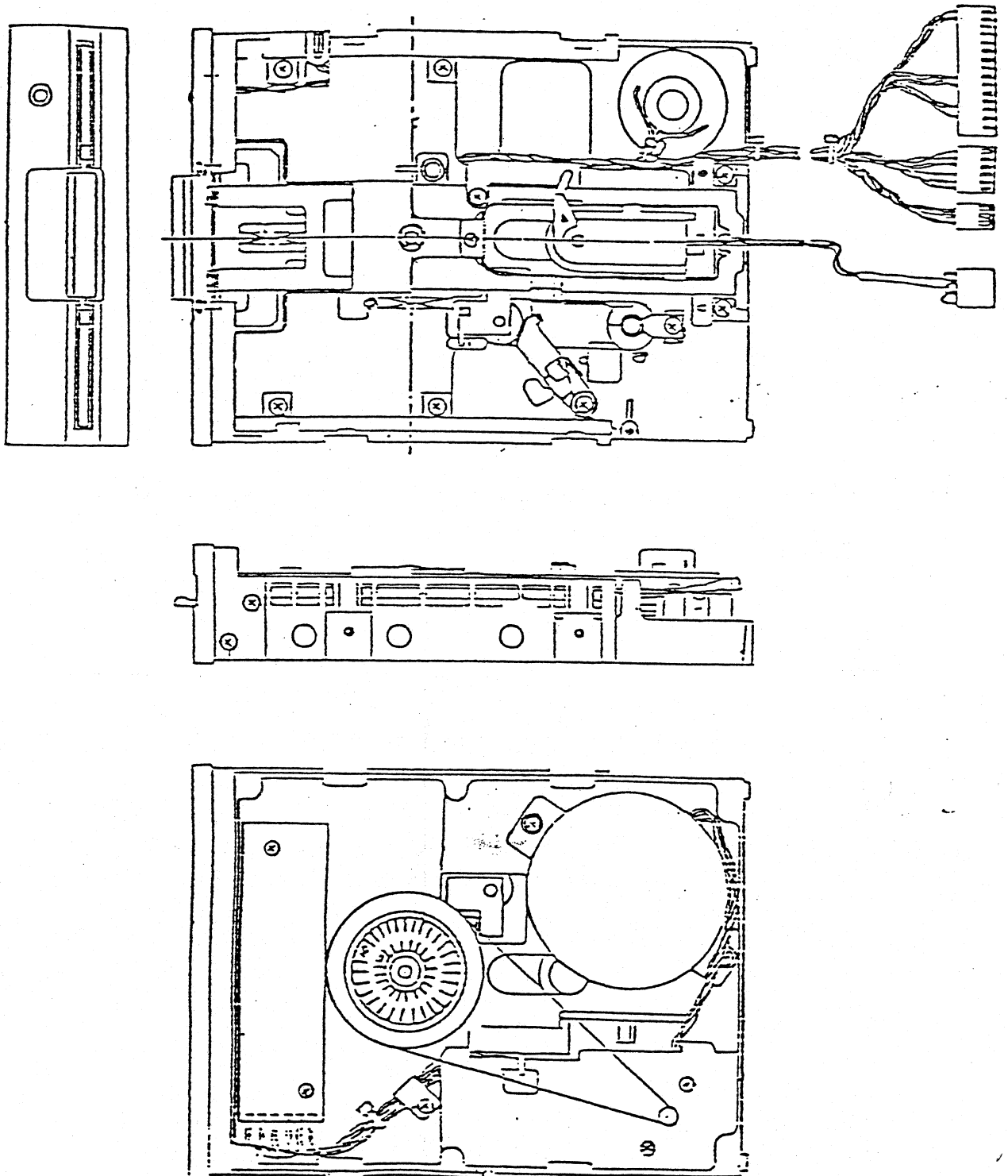
2.3.37 By turning the spindle pulley the rest of the belt will seat completely on the pulley.

2.3.38 FIG 10

Part	Description
12	drive belt



2.3.39 FIG 11; Completed Drive Mechanism



Chapter Three

3.1 Description

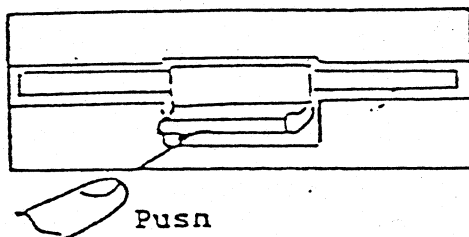
Since the disk drive is placed under direct control of the interface and power supply, no special procedure is required for starting and operation.

3.2 Operating procedure

Make sure that the power supply and I/O connector are connected, then insert the disk in accordance with the following procedure.

3.2.1 Inserting the media

- a) Apply DC voltage to the drive.
- b) Open the front door.



- c) With the index hole and write protect notch being placed on the left side of the jacket, push the media in, when the media is fully inserted the locking action can be felt.
- d) Push the door downward and close the door so that it is locked firmly

3.2.2 Extracting the media

- a) Open the front door. The media will pop out automatically to a position where you can extract it easily.
- b) For protection of the recorded data, the media should always be stored in its envelope.
- c) Close the door of the drive.

3.3 Media handling procedure

Since the media has been subjected to a write operation it naturally contains information, adequate attention must be paid to its handling.

In order to extend the life of the media and eliminate the causes of errors, it is best to take the following steps:

- a) When writing something on the jacket label of the media, do not use a ball point pen or pencil, use felt-tipped pens.
- b) Do not hold the edges of the media with paper clips or the like.
- c) Do not touch the media exposed in the slot of the jacket.
- d) Do not attempt to clean the media.
- e) Do not keep the media in the areas where there is a strong magnetic field.
- f) The diskette should be kept in its jacket.
- g) Special care should be exercised so that the media is kept free from liquid, dust, metal particles, etc.
- h) Take care not to exceed the following environmental conditions:

Temperature	10 to 47°C
Relative humidity	20 to 80 %

3.4 Seek error

Few seek errors will be experienced due to the low stepping rate, less than 12 msec/track. In case of a seek error, however, recalibration of track position can be performed. This can be done by repeatedly stepping the head towards track 0 until track 0 status is detected.

3.5 Write error

In order to check the quality of the data, perform a read-after-write operation. When data can not be read, rewrite that track and sector once again.

When data can not be read after four such operations track is defective.

3.6 Read error

What happens quite often when performing a read operation is a soft error. A soft error is defined to be a read error which is recoverable by making ten or less read operations. However, in the event no recovery is made in ten operations, move one step from the track in the same direction as the previous step, then return one step. If this fails to read the data, this error is unrecoverable.

3.7 Description

Periodic maintenance is indispensable so that this type of peripheral equipment operates properly. It is particularly important to periodically clean the head and check the load pad. Repairs and adjustments should be made in accordance with the procedures below.

3.8 Head Cleaning

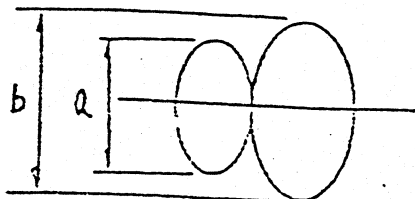
Check for excessive dust or magnetic oxide on the load pad. With the door open (do not move upper arm greater than what is provided by opening the front door) clean head with lint free cotton cloth or 'Q-tip' in 91% isopropyl alcohol. Wipe the head carefully to remove any dust and/or oxide.

3.9 Adjustment Procedure

In case of a malfunction or parts replacement, make the following adjustments. In order to maintain the interchangeability of the media between drives it is desirable to check each drive against a master alignment diskette.

3.9.1 Track adjustment (radial track)

- Connect I/O cable and restore the head to track 00.
- Insert a 48tpi alignment diskette and close the door.
- Connect two oscilloscope probes to pin 1 and pin 14 of UH6 (592), set oscilloscope to analog mode at 50mV/cm and 200 msec/div.
- Load the head and allow it to seek to track 16, check for cats eye wave form. When the cats eye lobe ratio is 70% or less, loosen the stepping motor mounting screws, turn the stepping motor to obtain the lobe ratio of 90% or less.
- After allowing the head to track 34, return it to track 16 and recheck the cats eye. If the ratio is correct tighten the stepping motor screws.

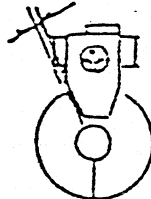


$$\frac{a}{b} \times 100 \geq 70$$

Cats eye lobe ratio

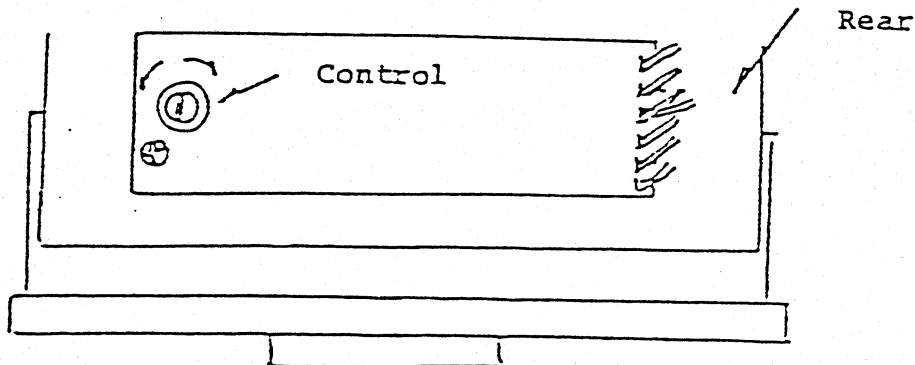
3.9.2 Track 00 adjustment

The drive is not provided with a track 00 sensor. To adjust, let the head over step in the track 00 direction and adjust the limiter position to obtain a clearance less than $0.25\text{mm} - 0.4\text{mm}$.



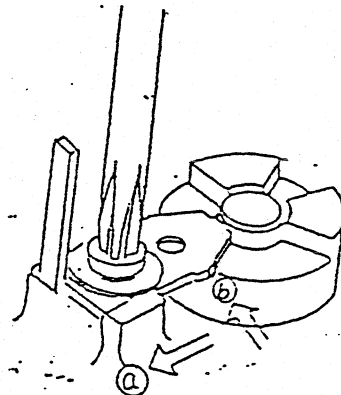
3.9.3 Speed control

Turn the variable resistor on the motor control board until the tachometer disk on the spindle pulley appears stationary when viewed with a fluorescent lamp.



3.10 Limiter Adjustment Procedure

- (1) Set the CPU to permit ARV-03 to execute.
- (2) Connect the drive to the equipment body (1541).
- (3) Switch ON the power to the equipment and insert a medium (dummy) into the drive and close the door.
- (4) Press **[A]** and **[RET]** keys.
- (5) Loosen the limiter screw a 1/4 turn, counterclockwise, position the limiter as instructed below, then retighten the screw.
 - ① Move the limiter in (a) \Rightarrow direction until it stops.
 - ② Next, move it 0.25 to 0.4 mm in (b) \Rightarrow direction.



Hold the limiter using a screwdriver as a lever so that the limiter does not rotate together with the screw when it is tightened. (Be careful not to damage the steel belt with the screwdriver.) As a criterion for screw tightening, the screw should not move when a torque of 5 kg-cm is applied to it.

(6) Press [R] key and check the clearance. (Clearance____)

(7) Press [D] key and check the sound.

* Sound checking method: Shall be the same evaluation method as that when making a bump test.

(8) Check the clearance.

* A 0.25-mm clearance gage shall be inserted into the clearance and a 0.4mm clearance gage shall be not inseterted.

When OK: Press [RET] key.

When NG: Press [N] and [RET] key.

Retry beginning (4).

(9) Press [SP] key.

* Visually confirm that the pulley moves towards the 1TK OUTER side and contacts the limiter.

When OK: Press [RET] key.

When NG: Press [N] and [RET] key.

Retry beginning (4).

(10) Press key.

* Visually confirm that the limiter does not move towards the outer side.

When OK: Press key.

When NG: Press and key.

Retry beginning (4).

(11) Remove the medium and switch OFF the power (1541 side only).

(12) Disconnect the connector.

(10) Press key.

* Visually confirm that the limiter does not move towards the outer side.

When OK: Press key.

When NG: Press and key.

Retry beginning (4).

(11) Remove the medium and switch OFF the power (1541 side only).

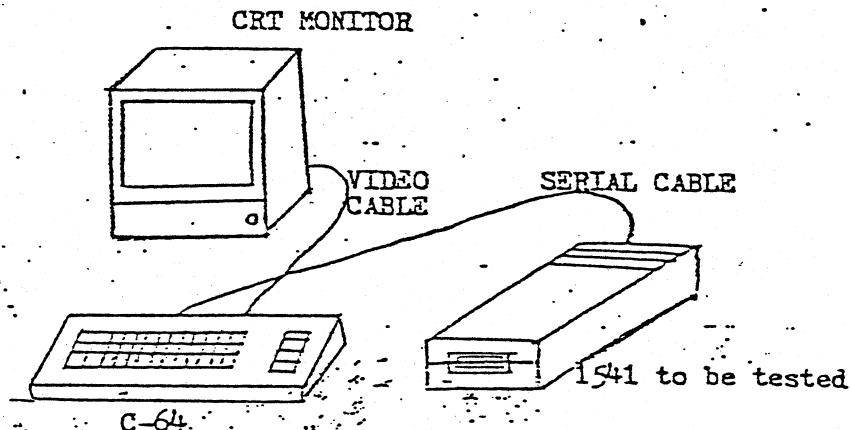
(12) Disconnect the connector.

3.11 DIAG TEST (BURN-IN) Procedure

3.11.1 Instrument for this test

Computer : C-64
CRT Monitor : 1510 or 1701 or the equivalent
Floppy Disk : 1541
PRG. Diskette : "DIAG" Diskette

3.11.2 Connection



3.11.3 Procedure

- (1) After setting the PRG diskette in to 1541 press keys as follows:

LOAD "DIAG *", 8

After the display of "READY" press key - **R U N RETURN**

After the following

appears on the screen, pull out the PRG dislette and store it.

Screen 1

CONNECT TEST DISK

TURN ON

PRESS F1 WHEN READY

- (2) The following appeass approx. 20 seconds after **F1** key is pressed when the disket is not set. Confirm that the red LED lmap of the test floppy disk is blinking.

Screen 2 1541 DIAG START

SEE LED

LED BLINK ?

YES=PRESS F1

NO =PRESS F3

- (3) After Confirmation of the LED lamp the following appears when **F1** key is pressed. Remove the Serial cable from the floppy disk and set the floppy disk to be tested next. The screen 1 will be displayed after **F1** key is pressed again.

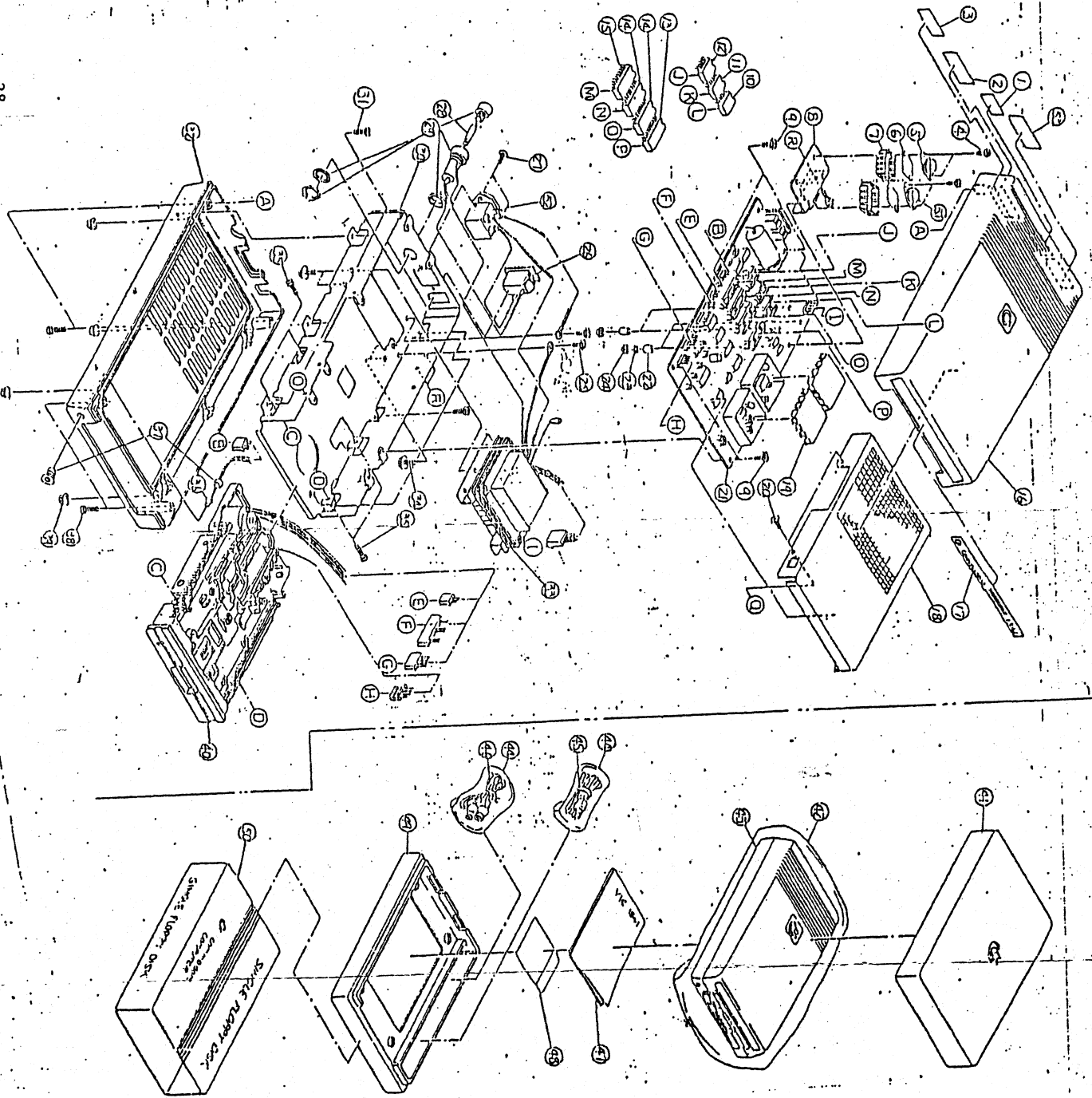
Screen3 REMOVE SERIAL CABLE
CONTINUE DIAG. TEST?
YES=PRESS F1
NO=PRESS F3

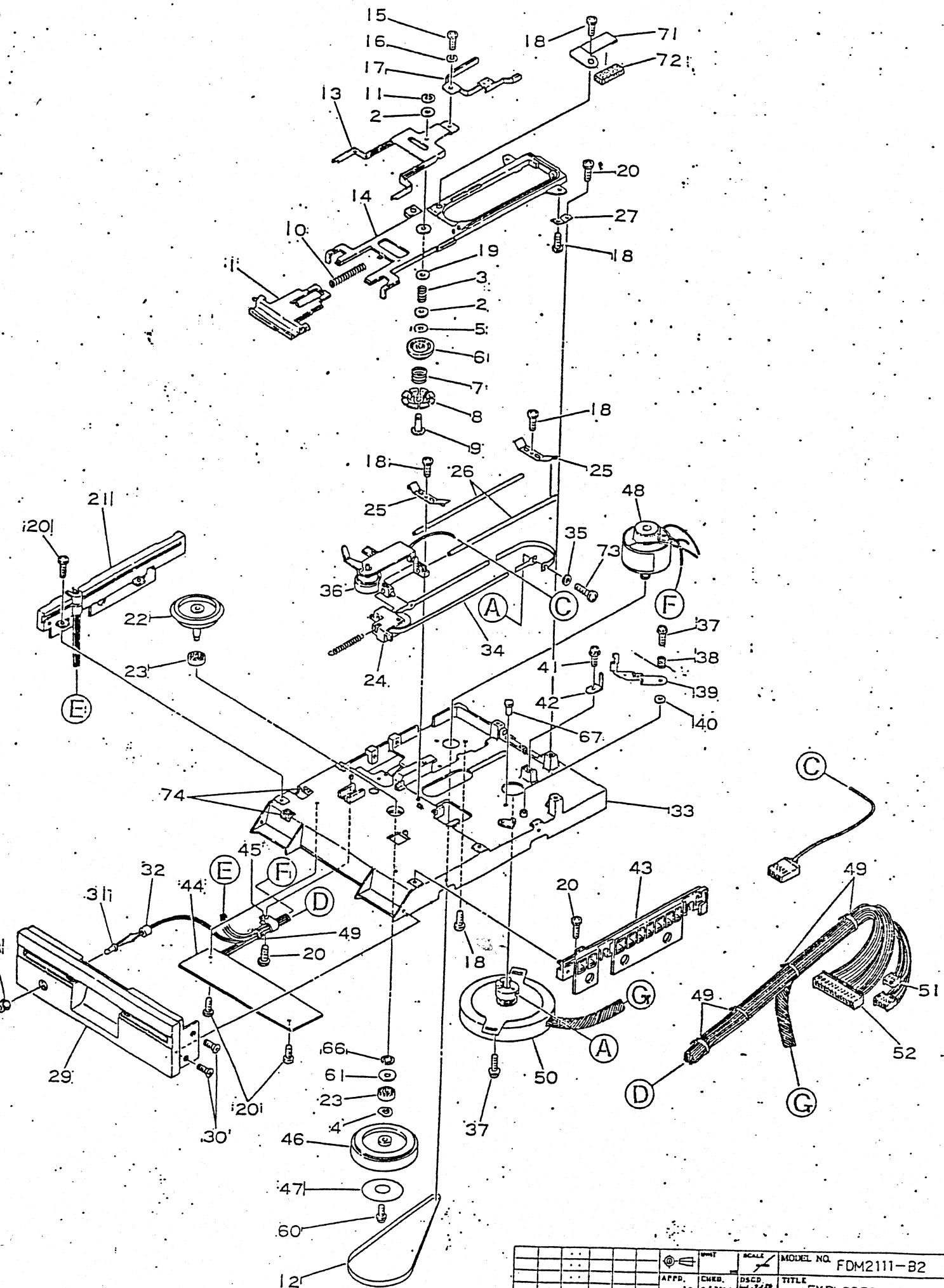
- (4) Under the following condition burn-in the floppy disk whose LED lamp blinks by the above procedure. The floppy disk is qualified when the LED lamp still blinks in the same way after the burn-in.

3.11.2 PARTS LIST FOR 1541

<u>No.</u>	<u>Name</u>	<u>P/No.</u>	<u>Q'ty</u>
1	Rating Label	1540030-01	1
2	Warning Label	1010019-01	1
3	FCC ID Label	320955-02	1
4	Screw with Ext. Tooth Metric, M3	325541-05	4
5	Voltage Regulator	901528-04	1
6	Insulation Mylar	904914	2
7	Heat Sink	1540011	2
8	Heat Sink	1540011	1
9	Screw with Ext. Tooth Metric, M3	325541-02	7
10	ROM	901229-03	1
11	ROM	325302-01	1
12	RAM	325502-03	1
13	CPU	901435-01	1
14	VIA	901437-01	2
15	Logic Array	325572-01	1
16	Top Case Assy	251185	1
17	Plate Model	1540052	1
18	Shield Cover	1540013	1
19	Shield Cap	4022047	2
20	Screw with Ext. Tooth Metric, M3	325541-02	2
21	PCB Assy	1540048-01	(1)
22	Tubing Insulation	905477-02	4
23	Lock Washer, External Toothed Metric	905655-03	2
24	Nut	905960-03	4
25	Screw with Ext. Tooth Metric, M4	325542-02	2
26	Switch Seesaw	904509-01	1
27	Screw Flat Head	906803-02	2
28	Fuse Slo Blo		1
29	Fuse Holder		1
30	Power Chassis	251153	1
31	Tapping Screw	906883-03	6
32	Bottom Case	1540015	1
33	Power Transformer	1540009-	1
34	Screw Metric, M5	325548-04	4

<u>No.</u>	<u>Name</u>	<u>P/No.</u>	<u>Q'ty</u>
35	Inch Pan Head Screw	906610-03	4
36	LED Assy	1540003-02	1
37	Lamp Holder Set	903820-01	1
38	Pan Head Screw	906800-02	4
39	Foot Self Adjesive	950150-01	4
40	Drive Mechanism	325519-02	1
41	Styrofoam Top	1540019	1
42	Poly Bag	1540025	1
43	Main Assy	1540005-06	(1)
44	Poly Bag	4022044-02	2
45	Power Cord		1
46	Cable, 6P DIN	1540027-01	1
47	User Manual	1540031-02	1
48	Diskette Demo	1540024-02-ZX	1
49	Styrofoam Bottom	1540020	1
50	Inner Carton	1540032-01	1
51	Voltage Regulator	901528-03	1
52	Power Connctor		1
53	Label, FCC Class B	325553	1





ZONE	SYMS	DATE	APPR	CHKD	DRG	UNIT	SCALE	MODEL NO.	FDM2111-B2
						APPR.	CHKD.	TITLE	EXPLODED VIEW
						DATE	APPR.	CHKD.	DRG

NO.	PART NO.	NAME	NO.	PART NO.	NAME	NO.	PART NO.	NAME
1	BH117-A	Door Assy.	25	HY616	Guide Shaft Keeper	49	GR123	Band
2	HY623	Collar	26	EY142	Guide Shaft	50	QY145-A	Stepper Assy.
3	WS114	Clamp Spring	27	HY712	Hinge Spring	51	BG126	Connector Housing
4	GW115	Wave Washer	28	BG111	LED Holder	52	BG127	Connector Housing
5	GW114	Thrust Washer	29	BH127	Front Panel	53		
6	BJ122-A	Collet Assy.	30	2A121064	Screw	54		
7	WS142	Hub Spring	31	DE111-AA	LED Assy.	55		
8	BJ112	Hub	32	BG211	LED Holder Ring	56		
9	EY114	Hub Shaft	33	VY119	Housing	57		
10	WS171	Door Spring	34	GR134	Steel Belt	58		
11	2LO03001	E-Washer	35	GW118	Washer	59		
12	GR111	Drive Belt	36	QY124-C	Head Assy.	60	2A271030	Screw
13	HY581	Hub Support	37	2A331050	Screw	61	2LFD0011	Washer
14	FY117	Hub Frame	38	WS157	Eject Spring	62		
15	2A151040	Screw	39	HY532-A	Eject Assy.	63		
16	2G102602	Washer	40	GW123	Poly Slider	64		
17	HY582-A	Arm Support Assy.	41	2A341060	Screw	65		
18	2A132040	Screw	42	HY551	Carriage Stopper	66	2M313001	C-Washer
19	HY625	Collar	43	BG262-A	Disk Guide-R Assy.	67	GP114	Eject Pin
20	2A131050	Screw	44	PM117AB	Motor Control P.C.B	68		
21	BG261-AH	Disk Guide-L Assy.	45	GR152	Cord Holder	69		
22	EY182	Spindle Unit	46	UP512	Spindle Pulley	70		
23	GU127	Spindle Bearing	47	GF111	Tacho Disk	71	JS482	Pad Holder
24	UP533-A	Tension Pulley Assy.	48	QY112	D.C Motor	72	GS112	Pressure Pad
						73	2A151030	Screw
						74	GS117	Pad

SCALE	UNIT	MODEL NO.	FDM2111 -B2
DSCD	CHKD.	TITLE	EXPLODED VIEW
Ref 2.34	24 5.94 Feb 2'89	DOCUMENT NO.	(2/2)
ZONE	SYMB	DATE	

PART NO.	DESCRIPTION
250448-01	PCB ASSY, 1541B

REVISIONS			
LTR	ZONE	DESCRIPTION	DATE APPROVED
1		PRELIMINARY RELEASE	8/15/84 S. Katayama
2		REVISED	8/28/84 S. Katayama
3		REVISED	9/15/84 S. Katayama
4		REVISED	11/21/84 S. Katayama
5		ADD ITEM 101 (INSULATION SPACE SHEET)	12/11/84 S. Katayama
6		REVISED	1/11/85 T. Tsubota
7		REVISED PER ECO 90012	1-22-85 YL
8		REVISED PER ECO 90018	1-28-85 YL
9		REVISED PER ECO 860080	2-3-86 G. G. K.
10		PILOT PRODUCTION RELEASE	3-7-86 G. G. K.

3. THE COMBINATION OTHER THAN THE FOLLOWING IS NOT ACCEPTED :

F.D.D. BY NEWTRONICS :

P/N0. 251643-03 OR P/N0. 251643-01

HYBRID-IC : P/N0. 251853-02

ROM (EP-ROM) : P/N0. 251968-01

J3 : SHORT

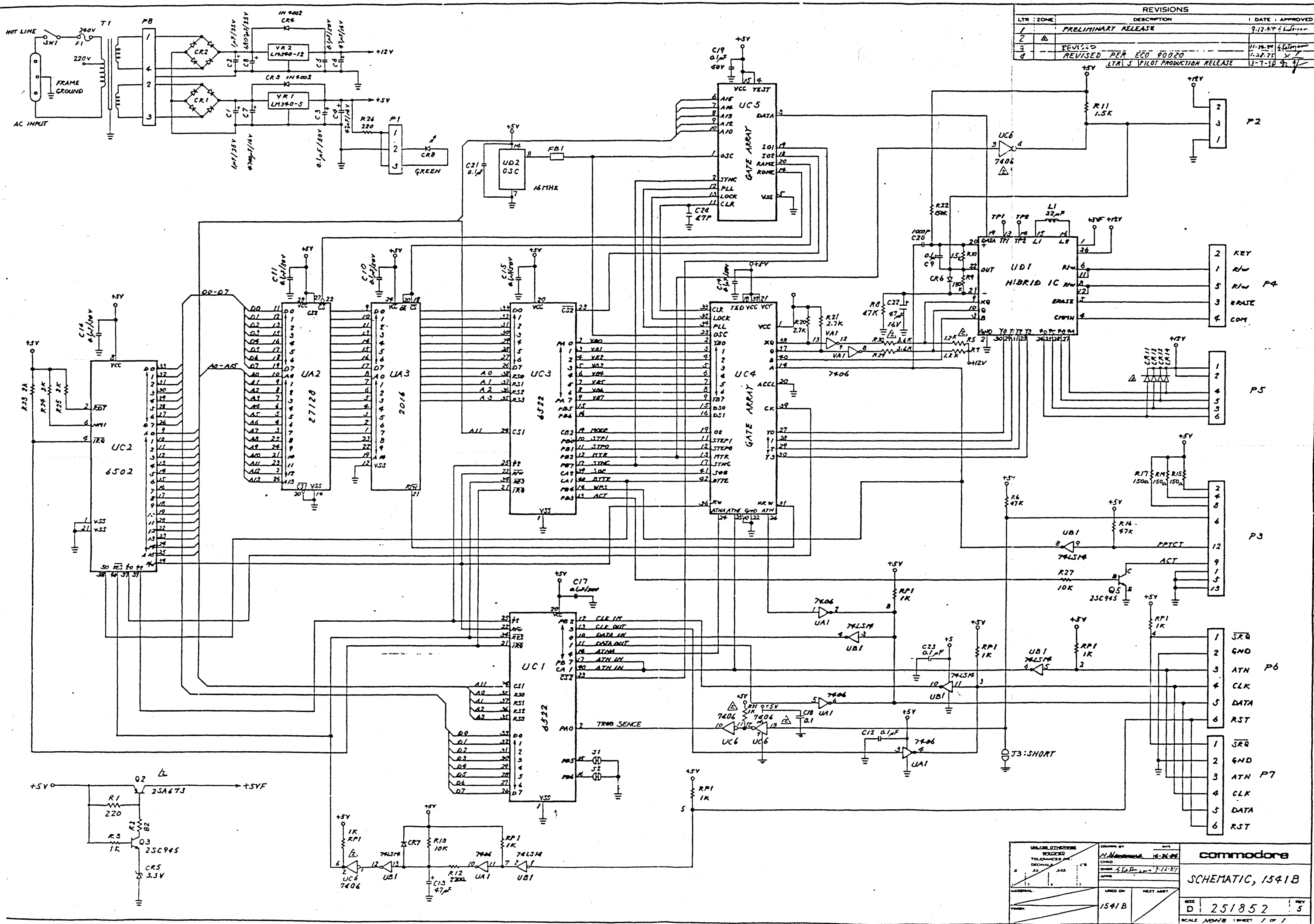
2. THIS 1541B PILOT PRODUCTION RELEASE IS APPLIED UNTIL THE STOCK OF F.D.D. BY NEWTRONICS (P/N0. 251643-03, -01) IS CLEARED.

1. SHEET 5 OF 5 SIZE B
ASSY DWG

NOTES-UNLESS OTHERWISE SPECIFIED :

commodore	TITLE: PCB ASSY, 1541 B	DRAWN BY: N. Kawanuma	DATE: 8-15-84	ENGR: S. Katayama	DATE: 8-15-84	SIZE: B	DRAWING NUMBER: 250448
		CHKD: S. Katayama		APPR: S. Katayama			SHEET

PART/DASH NO.				ITEM NO	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
				01					
				1					
				2	D	251852-01	SCHEMATIC DIAGRAM, 1541B		
				3					
				4	B	251854-01	PCB, 1541B		
				5					
				6					
				7	B	901435-01	IC, MPS 6502 CPU	UC2	
				8	B	901437-01	IC, 6522 VIA	UC1, 3	
				9					
				10	B	251968-01	IC, 27128 EP ROM	UA2	
				11	B	325502-03	IC, TMM2016P S-RAM	UA3	
				12					
				13					
				14	B	251828-01	IC, GATE ARRAY 40PIN	UC4	
				15	B	251829-01	IC, GATE ARRAY 20PIN	UC5	
				16	B	251828-02	IC, GATE ARRAY 42PIN	UC4	SUBSTITUTE FOR ITEM 14.
				17					
				18					
				19	D	251853-02	IC, HYBRID READ AMP/WRITE	UD1	
				20					
				21	B	901522-06	IC, 7406	UA1, UC6	
				22	B	901521-30	IC, 74LS14	UB1	
				23					
				24	B	901521-73	IC, 74LS06	UA1, UC6	SUBSTITUTE FOR ITEM 21.
				25		902720-01	TRANSISTOR 2SA673	Q2	
				26		902671-01	2SC945	Q3, 5	SUBSTITUTE FOR ITEM 26.
				27		902693-01	2SC1815	Q3, 5	SUBSTITUTE FOR ITEM 26.
				28		902693-03	TRANSISTOR 2SC1740	Q3, 5	KBP-005
				29		900756-01	DIODE RECTIFIER, FULL WAVE BRIDGE 1.5A 50V	CR1, 2	(11, 12, 13, 14) SEE NOTE 2
				30		900750-02	RECTIFIER	CR3, 4	
				31		900850-01	IN4148	CR6, 7	
				32		325505-02	ZENER 3.3V 500MW	CR5	SUBSTITUTE FOR ITEM 32.
				33		325505-03	ZENER 3.3V 500MW	CR5	SUBSTITUTE FOR ITEM 32.
				34	B	900948-06	DIODE, ZENER 3.3V 500MW	CR5	
				35					
				36					
				37					
				38					
commodore				TITLE: PCB ASSY, 1541B			DRAWN BY: N. Honomura		REV 10
							CHKD: Skibana		
							DATE: 8-13-87		
							DATE: 8-15-87		
							ENCOR: J. Chudajala		
							APPR:		
							DATE: 8-15-87		
							SIZE: B		
							DRAWING NUMBER: 250448		
							SHEET: 2 OF 5		



PART NO.	DESCRIPTION
1540048-01	FCC (UL) PCB ASSY. VIC-1541. USED LOGIC ARRAY.
1540048-02	PCB ASSY. VIC-1541. USED LOGIC ARRAY.

TITLE: <u>PCB ASSY. VIC-1541.</u>				
REVISIONS				
LTR	ZONE	DESCRIPTION	DATE	APPROVED
A		PRODUCTION RELEASE	12/12/82	T. HARTSON/RT
B		REVISED PER ECO 830085	7/27/83	LI. G. un
C		REVISED PER ECO 830125	7/25/83	W. K. un
D		REVISED PER ECO 830257	8/21/83	W. B. un
E		REVISED PER ECO 830368	8/11/83	W. B. un
F		REVISED PER ECO 830379	8-9-83	W. B. un
G		REVISED PER ECO 830410	9-21-83	W. B. un
H		REVISED PER ECO 830423	10-13-83	W. B. un
J		REVISED PER ECO 830531	12-23-83	W. B. un

1540048
REV. 11

(Print Here)

1. SHEET 7 TO 10 OF 10 SIZE B
ASSY DWG

NOTES-UNLESS OTHERWISE SPECIFIED:

commodore	DRAWN BY: <u>T. Takubo</u>	DATE: <u>11/16/82</u>	ENGR: <u>6</u>	SIZE: <u>B</u>	SHEET: <u>1</u> OF <u>10</u>
	CHKD		APPR: <u>T. MATSUOKA</u>		

QUANTITY REQD PER PART / DASH NO.			ITEM #	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
			1	B	P C BOARD 238 x155 x1.6t			GLASS EPOXY. G-10
			2					
			3					
			4					
			5	C	SCHEMATIC DIAGRAM			USED LOGIC ARRAY. FCC (UL)
			6	C	SCHEMATIC DIAGRAM			USED LOGIC ARRAY.
			7					
			8					
			9					
			10					
			11					
			12	B	IC MPS 6502 CPU	UC4		
			13		MPS 6522 VIA	UC2, UC3		
			14		2364 -197 ROM	UB4		\$E000 ~ \$FFFF
			15		2364 -130 ROM	UB3		\$C000 ~ \$DFFF
			16		LOGIC ARRAY 40 PIN DIP	UC1		
			17		74LS00 2-NAND	UC6		
			18		74LS42 DEC.	UC7		
			19		7417 BUFFER	UD2		
			20		74LS86 2-EX-OR	UD3		
			21		7406 INV. BUF.	UB1, UD1		
			22		74LS04 INV.	UC5		
			23		74LS14 SCH. INV.	UA1		
			24		74LS193 4BIT. COUNTER	UE6		
			25		74LS197	UD5		
			26		74177	UD5		SUBSTITUTE FOR ITEM 25.
			27		9602	UD4		
			28		LM311	UE4		
			29	B	IC NE592	UF3, UF4		
			30	B	IC TMH2016P RAM	UB2		SUBSTITUTE FOR ITEM 30.
			31	B	IC M58725P RAM	UB2		SUBSTITUTE FOR ITEM 19.
			32	B	IC 7407	UD2		SUBSTITUTE FOR ITEM 22
			33	B	IC 74LS14 SCH. INV.	UC5		
			34	B	IC 7404 INV.	UC5		
			35	B	IC 7414 SCH. INV.	UC5		SUBSTITUTE FOR ITEM 22
			36					
			37					

commodore

TITLE: PCB ASSY VIC-1541

DATE: 11/16/82

ENGR: JTO

DATE: 11/17/82

REV: J

REV: 1540048

SHT: 2/10

QUANTITY REQD PER PART / DASH NO.		ITEM	Q	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
	0201							
	22	38	B	902671	TRANSISTOR NPN 2SC945	Q2-Q7		
	33	39		902693-01	2SC1815	Q2-Q7		SUBSTITUTE FOR ITEM 38.
	44	40		902679	2SD467	Q8-Q11		
	55	41		902682-01	NPN 2SC2120	Q8-Q11		SUBSTITUTE FOR ITEM 40.
	11	42		902720	PNP 2SA673	Q1		
	22	43		902717	2SA733	Q3-Q6		
	33	44		902744-01	PNP 2SA1015	Q3-Q6		SUBSTITUTE FOR ITEM 43.
	44	45	B	902682-02	TRANSISTOR NPN 2SC2060	Q8-Q11		SUBSTITUTE FOR ITEM 40.
	55	46						
	66	47						
	77	48						
	88	49						
	99	50	B	325505-03	DIODE, ZENER 3.3V 500mW ±5%	CR5		SUBSTITUTE FOR ITEM 55.
	100	51		325506-02	ZENER 5.1V 500mW ±5%	CR13		SUBSTITUTE FOR ITEM 58.
	101	52		900750-02	RECTIFIER IN4002	CR2,4,8-11		
	102	53		900850-05	SIGNAL WGT13C	CR6,7,12,14-18		
	103	54		900850-01	SIGNAL IN4148	CR6,7,12,14-18		SUBSTITUTE FOR ITEM 53.
	104	55		325505-01	ZENER 3.3V 500mW ±5%	CR5		HZ3C-2
	105	56		325505-02	3.5V 500mW ±5%	CR5		HZ4A-1 SUB. FOR ITEM 55.
	106	57		900948-06	3.3V 500mW ±5%	CR5		IN3226B SUB. FOR ITEM 55.
	107	58		325506-01	5.1V 500mW ±5%	CR13		HZ5C-2
	108	59		900948-11	ZENER 5.1V 500mW ±5%	CR13		IN5231 SUB. FOR ITEM 58.
	109	60		900756-01	BRIDGE 1.5A 50V	CR1,CR3		KBP-005
	110	61		900850-19	DIODE SIGNAL MA162	CR6,7,12,14-18		SUBSTITUTE FOR ITEM 53.
	111	62		325546-06	CRYSTAL MODULE 16MHZ 100ppm	Y1		SUBSTITUTE FOR ITEM 64 (KYOCERA)
	112	63		-07	100ppm	Y1		SUBSTITUTE FOR ITEM 64 (TOKYO)
	113	64		-01	50ppm	Y1		
	114	65	B	325566-02	CRYSTAL MODULE 16 MHz 100ppm	Y1		SUBSTITUTE FOR ITEM 64.
	115	66						
	116	67	B	251188-01	COIL, INDUCTOR 2.2μH	L1		SUBSTITUTE FOR ITEM 69
	117	68		251472-01	2.2μH	L1		SUBSTITUTE FOR ITEM 69
	118	69		325513-01	2.2μH	L1		
	119	70		325513-02	22μH	L9, L10		
	120	71		325513-03	100μH	L8, L11, L12		
	121	72		251188-02	22μH	L9, L10		SUBSTITUTE FOR ITEM 70
	122	73		251472-02	22μH	L9, L10		SUBSTITUTE FOR ITEM 70
	123	74	B	251188-03	COIL, INDUCTOR 100μH	L8, L11, L12		SUBSTITUTE FOR ITEM 71

commodore

TITLE: PCB ASST. VIC-1541

REV 1

DATE 12/17

SIZE B

1540048

SHT 3

QUANTITY REQD PER
PART / DASH NO.

										ITEM	QTY	SS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
										0201							
										1	1	B	901528-04	VOLTAGE REGULATOR 12V, 1.5A	VR1		LM340-12 70-3
										1	1	B	-03	VOLTAGE REGULATOR 5V, 1.2A	VR2		LM340-5 70-3
										S	5	B	901528-05	VOLTAGE REGULATOR 5V, 1A	VR2		SUBSTITUTE FOR ITEM 76
										2	2	B	904914	INSULATION MYLAR 70-3			
										S	5	B	325551-01	INSULATION SILICONE 70-3			SUBSTITUTE FOR ITEM 79.
										2	2	B	903361	CONNECTOR, PIN 6P	P2, P3		
										4	4	B	904150-06	SOCKET IC LOW PRO 40 PIN			
										3	3	B	904150-04	SOCKET IC LOW PRO 24 PIN			
										90							
										91							
										92							
										93							
										94							
										95							
										1	1	B	251065-04	HEADER ASSY. 2.5 PITCH 4 PIN	P8		MOLEX 5048-04 AG
										1	1		325562-06	6 PIN	P7		3022-06A
										1	1		325562-15	15 PIN	P6		3022-15A
										2	2		325562-03	2.5 PITCH 3 PIN	P4, P5		3022-03A
										1	1	B	903316-04	HEADER ASSY. 3.96 PITCH 4 PIN	P1		MOLEX 5271-04A
										101							
										102							
										103							
										104							
										105							
										106							
										107							
										108							
										109							
										110							
										111							

commodore

TITLE: PCB ASSY. VIC-1541

DRAWN BY:
T. T. Lunde

DATE
10/11/82

ENGR: J. D.

DATE
1-11/7

SIZE
B

REV
J

SHT
4

1540048

QUANTITY REQD PER PART / DASH NO.							QTY	S	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
								B	901751-43	RESISTOR METAL OXIDE 1/4W ±1% 91Ω	R51		
									-18				
									-44				
								B	901751-45	RESISTOR METAL OXIDE 1/4W ±1% 91KΩ	R52		
								B	325563-01	FERRITE BEAD	L2-7,13-16		
								B	903025-01	FERRITE BEAD	L2-7,13-16		SUBSTITUTE FOR ITEM 158.
								B	4022048	SHIELD BOX			
								B	4022047	SHIELD CAP			
								B	1540023	HEAT SINK 70-3			
								B	1540011	HEAT SINK REGULATOR			
									904907-01	COMPOUND THER FOR HEAT SINK			
								B	325541-05	SCREW PAN HEAD/EXT TOOTH WASHER M3-12			
								B	905655-03	EXTERNAL TOOTH WASHER M3			
								B	905960-03	NUT HEX. M3			
								B	905477-04	TUBING INSULATION 3.0 DIA x 7MM			USE WITH ITEM 76
								B	905477-02	TUBING INSULATION 3.5 DIA x 5 MM			SUBSTITUTE FOR ITEM 176 USE WITH ITEM 77
								B	905477-05	TUBING INSULATION 0.8 DIA x 25MM			
								B	251584-01	WRAPPING WIRE AWG 28 L=30MM			
									-02				
								B	251584-03	WRAPPING WIRE AWG 28 L=119MM			

DATE: 12/7
 SIZE: B
 REV: J
 SHEET: 6/10

QUANTITY REQD PER PART / DASH NO.		ITEM	QTY	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
	02 01							
		1	112	B	900301-04	CAPACITOR ELECTROLYTIC 220µF/10V	C13	
		1	113		900101-45	6800µF/25V	C17	
		1	114		900101-32	4700µF/16V	C16	
		2	115		900100-33	47µF/16V	C2, C5	
		2	116		900100-32	ELECTROLYTIC 1µF/25V	C1, C4	
		1	117		900402-15	TANTALIUM 10µF/25V	C15	
		1	118		900402-11	TANTALIUM 3.3µF/25V	C44	
		1	119		251070-16	CERAMIC 33µF/50V	C31	± 5%
		2	120		9000010-53	330µF/50V	C32, C36	± 5%
		3	121		-54	680µF/50V	C45, C33, C34	± 5%
		1	122		-25	1000µF/50V	C41	
		24	123		-20	0.1µF/50V	C3, 6-10	14, 18, 19, 20, 22-30, 35, 40, 43, 47, 48
		2	124		900010-14	CERAMIC 0.022µF/50V	C39, C42	
		1	125		900100-40	ELECTROLYTIC 100µF/16V	C46	
		2	126		900402-17	TANTALIUM 0.47µF/16V	C37, C38	
		1	127		-08	4.7µF/25V	C21	
		1	128		900402-14	TANTALIUM 1µF/35V	C11	
		1	129	B	900465-02	CAPACITOR CERAMIC 0.033µF/25V	C12	
			130					
			131					
			132					
		1	133	B	901550-04	RESISTOR CARBON 1/4W±5% 6.8KΩ	R25	
		1	134		-56	47Ω	R1	
		2	135		-108	360Ω	R14, R24	
		4	136		-89	150Ω	R17, 18, 45, 46	
		5	137		-52	220Ω	R4, 16, 36, 55, 57	
		2	138		-14	330Ω	R3, R23	
		6	139		-58	470Ω	R20, 22, 30, 37, 38	41
		1	140		-38	510Ω	R27	
		6	141		-31	680Ω	R31, 42, 47, 50	
		6	142		-01	1KΩ	R2, 5, 6, 7, 8, 43	
		4	143		-53	2KΩ	R9, 10, 26, 58	
		5	144		-18	2.2KΩ	R19, 21, 32-34	
		1	145		-69	1.5KΩ	R40	
		4	146		-12	22KΩ	R12, 35, 39, 52	
		1	147		-07	100KΩ	R44	
		1	148	B	901550-03	RESISTOR CARBON 1/4W±5% 5.1KΩ	R11	

commodore

PCB ASSY VIC-1541

DATE: 1/16/72

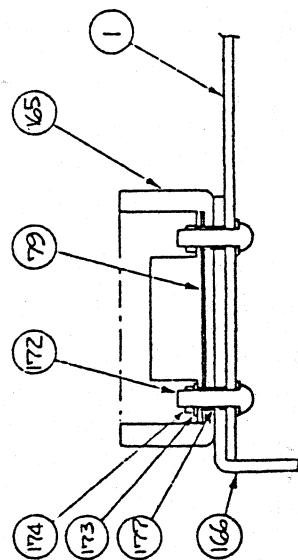
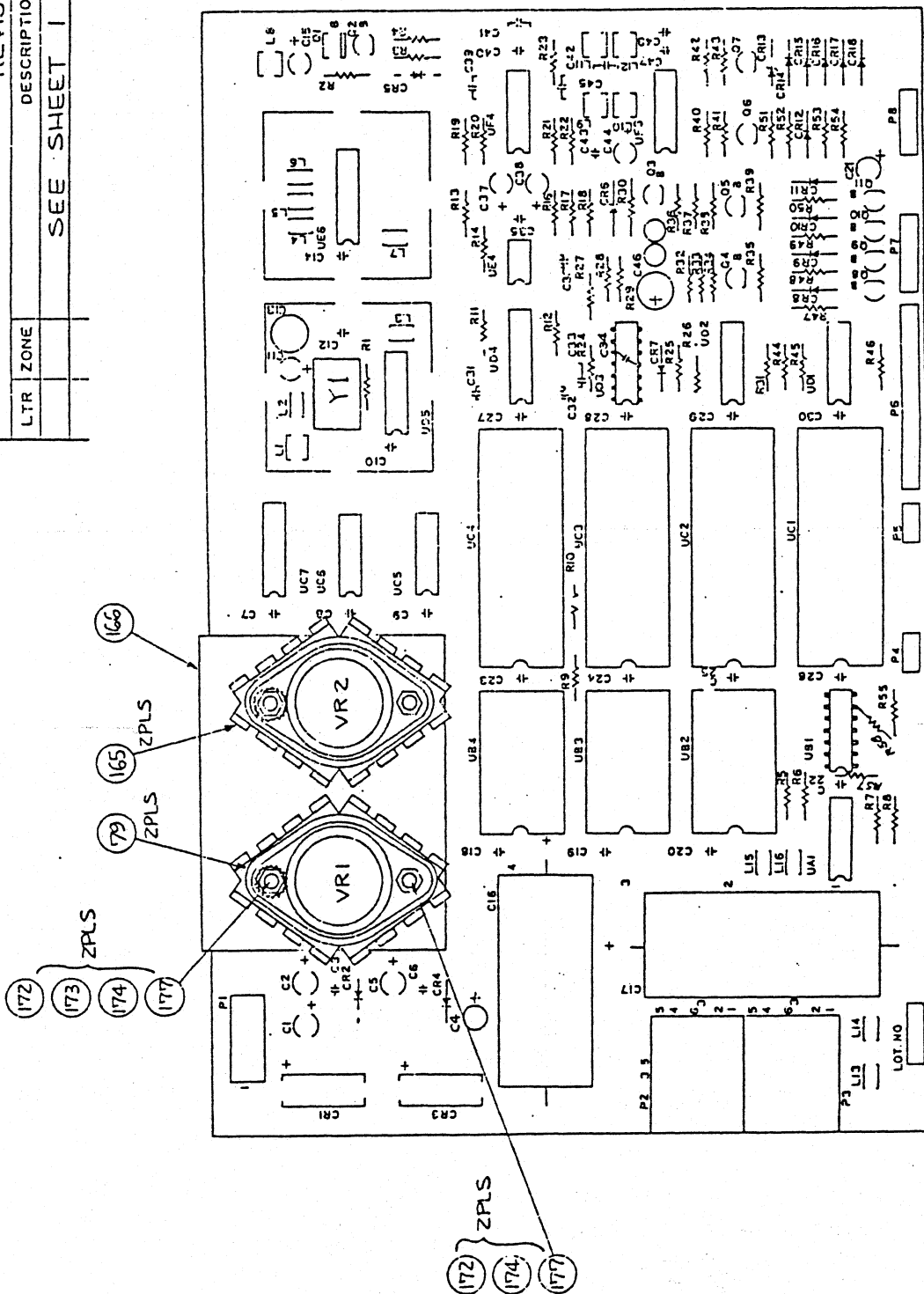
ENG: 40

SIZE: B

REV: 1

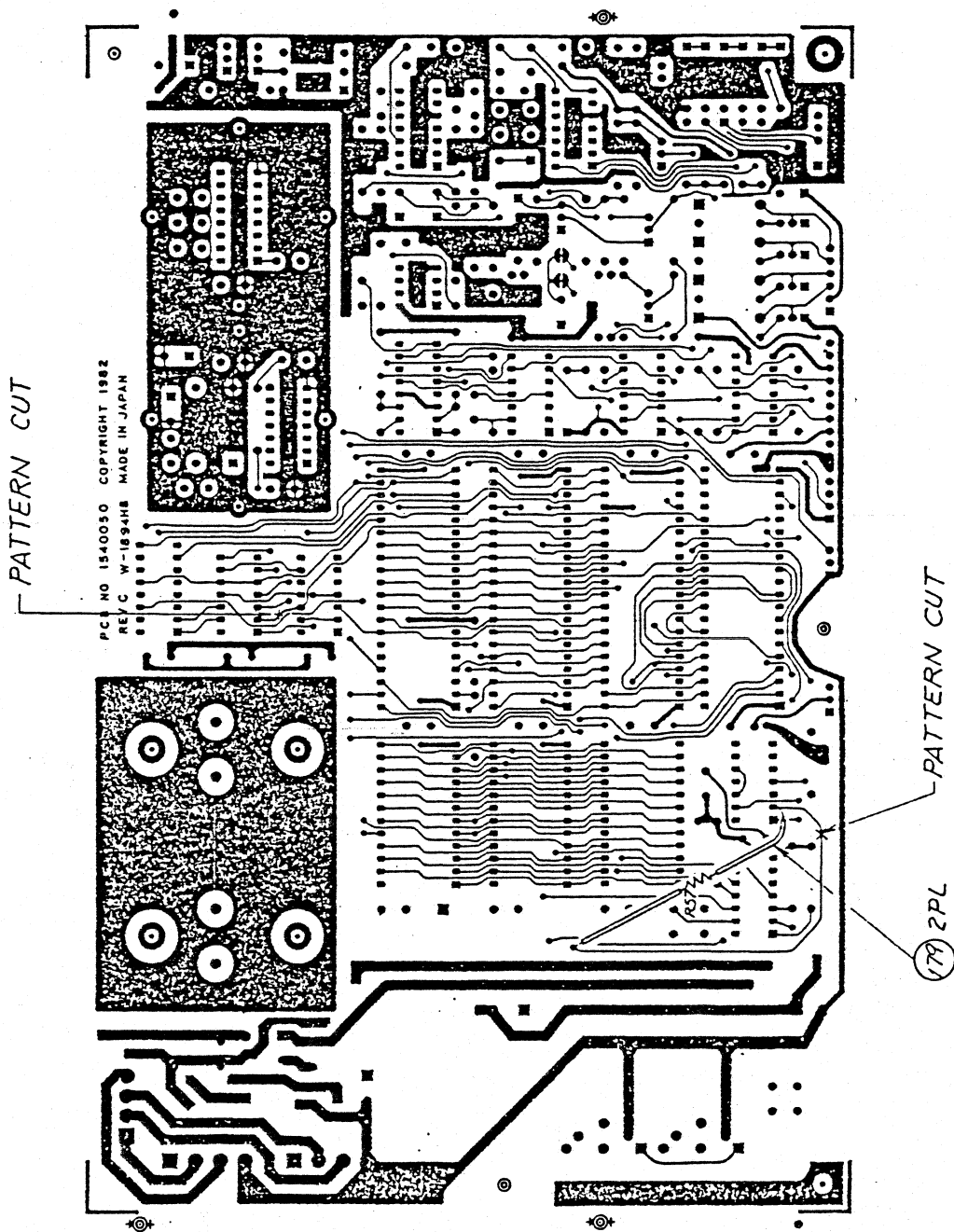
SHT: 5

LTR	ZONE	DESCRIPTION	DATE	APPROVED
		SEE SHEET 1		



UNLESS OTHERWISE SPECIFIED TOLERANCES ON:		DATE		commodore P.C.B ASSY VIC-1541	SIZE B	REV U
DECIMALS		1/16/82				
.XX		2/19/82				
.XXX		2/26/82				
.X		DRAWN BY: K. Maryanna				
Z'S		CND: T. F. Luch				
		ENGR: J. H. S.				
		APPR: J. H. S.				
MATERIAL:		USED ON		VIC-1541		
\pm \pm \pm		NEXT ASSY				
FINISH:						

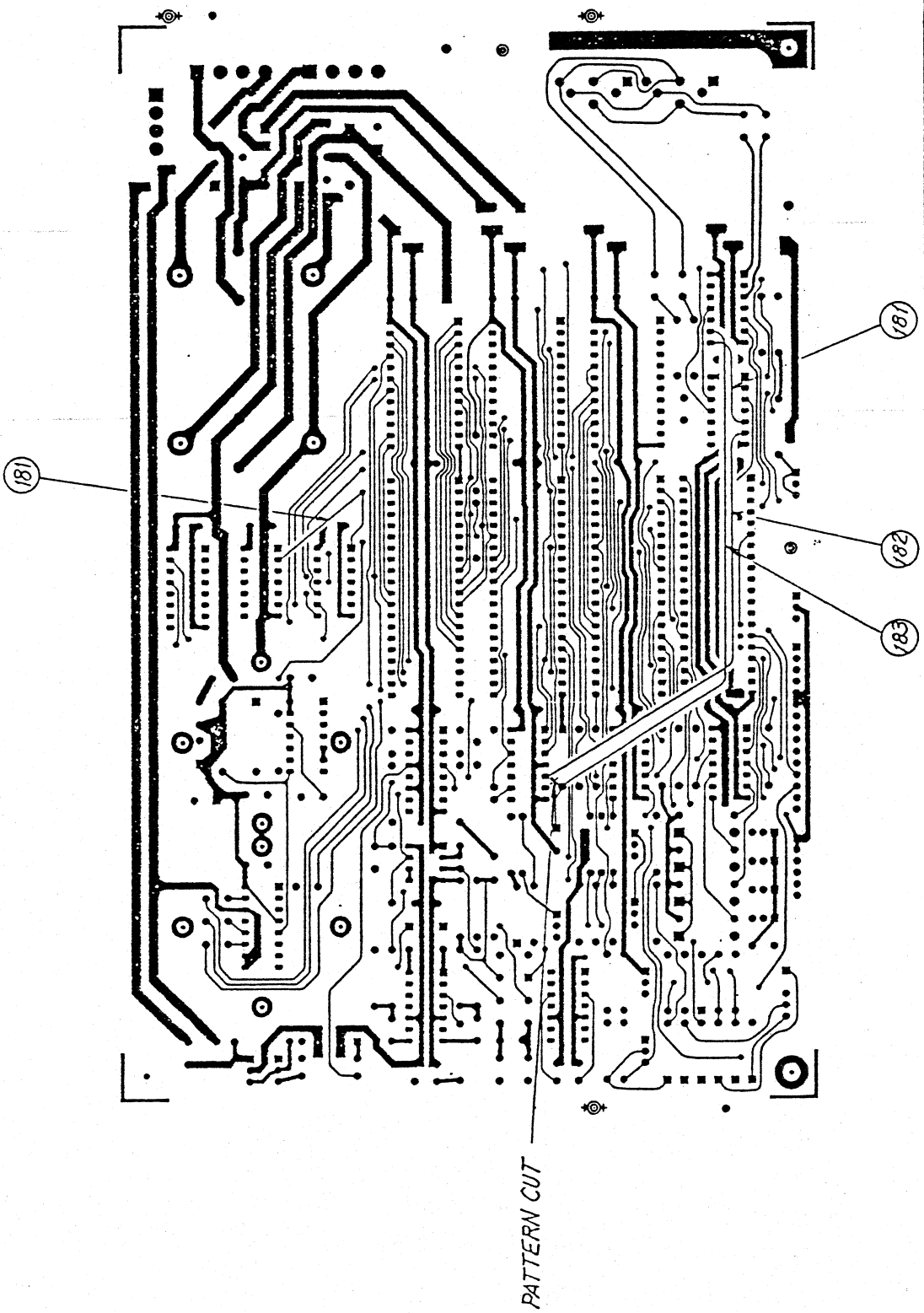
REVISIONS			
LTR	ZONE	DESCRIPTION	DATE
		SEE SHEET 1	
			APPROVED



-01, -02 SHOWN

UNLESS OTHERWISE SPECIFIED TOLERANCES ON: DECIMALS .XX .XXX .4'S		DRAWN BY: R. Jida	DATE: 9-6-83
X		CHKD: J. Jida	9/10/83
		ENGR: J. Jida	9/28/83
		APPR:	
MATERIAL:		USED ON	NEXT ASSY
FINISH:		VIC-1541	
		SIZE B	REV J
		commodore	
		PCB ASSY	
		VIC-1541	

REVISIONS			
LTR	ZONE	DESCRIPTION	DATE
		SEE SHEET 1	
			APPROVED



-01, -02 SHOWN

DRAWN BY: <i>R. J. Jala</i>		DATE 9-6-83
CHKD BY: <i>K. J. Jala</i>		7/19/83
ENGR: <i>T. J. Jala</i>		9/25/83
APPR:		
NEXT ASSY		
USED ON VIC-1541		
UNLESS OTHERWISE SPECIFIED TOLERANCES ON: DECIMALS .XXX ANGLES 4° HOLE DIA .001 MATERIAL: FINISH:		
commodore		REV J
PCB ASSY		
VIC-1541		
SIZE B	1540048	
SCALE NONE		SHEET 10 OF 10

QUANTITY REQD PER PART/DASH NO.				ITEM	S	PART NUMBER	DESCRIPTION	REF. DES	BEND	NOTES
				1	C	1540007	P.C. BOARD 315x155x1.62			MTL: GLASS EPOXY 6-10
				2						
				3						
				4	C	1540008-01	SCHEMATIC DIAGRAM			
				5	C	1540008-02	SCHEMATIC DIAGRAM			
				6	B	901229-03	IC 2364-197 ROM	UAB5		\$E000 ~ \$FFF
				7	B	901435-01	IC MPS 6502 CPU	UCD5		
				8	B	325302-01	2364-130 ROM	UAB4		\$C000 ~ \$DFFF
				9	B	325303-01	2364-131 ROM	UAB5		\$E000 ~ \$FFFF
				10		901437-01	MPS 6522 VIA	UAB1,UCD4		
				11		901471-01	MPS 2114 RAM	UA2,3,UB2,3		
				12		901521-01	74LS00 2-NAND	UB7,UFS		
				13		901521-21	74LS02 2-NOR	UE5		
				14		901521-02	74LS04 INV.	UB6		
				15		901521-24	74LS10 3-NAND	UF3		
				16		901521-30	74LS14 SCH. INV.	UC1		
				17		901521-17	74LS42 DEC.	UB8		
				18		901521-06	74LS74 D-FF	UE4,UF6		
				19		901521-32	74LS86 2-EX-OR	UG2		
				20		901521-15	74LS133 13-NAND	UC2		
				21		901521-18	74LS139 Dem. P	UE2		
				22		901521-28	74LS164 8 Bit Shift Reg	UD2		
				23		901521-12	74LS165 8 Bit Shift Reg	UD3		
				24		901521-40	74LS191 4 Bit Count.	UE3		
				25		901521-26	74LS193 4 Bit Count.	UE7,UF4		
				26		901521-45	74LS245 Bus Transceiver	UC3		
				27		901522-32	7402	UC7		
				28		901522-06	7406 INV. OC.	UD1,UF2		
				29		901522-03	74177	UC6		
				30		901510-01	9602	UG3		
				31		901523-04	LM311	UH4		
				32	B	901523-08	NE592	UHS,UH7		
				33	B	901522-01	7417	UG4		
				34	B	901521-54	74LS197	UC6		
				35	B	901229-02	2364-186 ROM	UAB5		
				36	B	901229-01	IC 2364-173 ROM	UAB5		
SUBSTITUTION FOR ITEM 29										
\$E000 ~ \$FFFF SUB. FOR ITEM 6.										
\$E000 ~ \$FFFF SUB. FOR ITEM 6. [2]										
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PART NO.	DESCRIPTION	REV	DATE	BY	REVISION	DATE	BY	REVISION	DATE	BY	REVISION
1540001 -01	PCB ASSY VIC-1540 (FCC) UL	A	8/26/81		PRODUCTION RELEASE	7.7	0.7				
1540001 -02	PCB ASSY VIC-1540	B	8/26/81		ADDED SHEET 6 OF 7 (FOR FCC)	7.7	0.7				
1540001 -03	PCB ASSY VIC-1541 (FCC) UL	C	8/13/81		ADDED DASH -03 AND -04	7.7	0.7				
1540001 -04	PCB ASSY VIC-1541	D	8/20/81		ADDED ITEM 6.	7.7	0.7				
		E	8/25/81		REVISED PER ECO 830084	7.7	0.7				
		F	11/29/81		REVISED PER ECO 830479	7.7	0.7				

[2] THIS ROM CAN BE USED ON ONLY USA - CANADA AND JAPAN'S VERSION FOR SUBSTITUTE FOR ITEM 35.

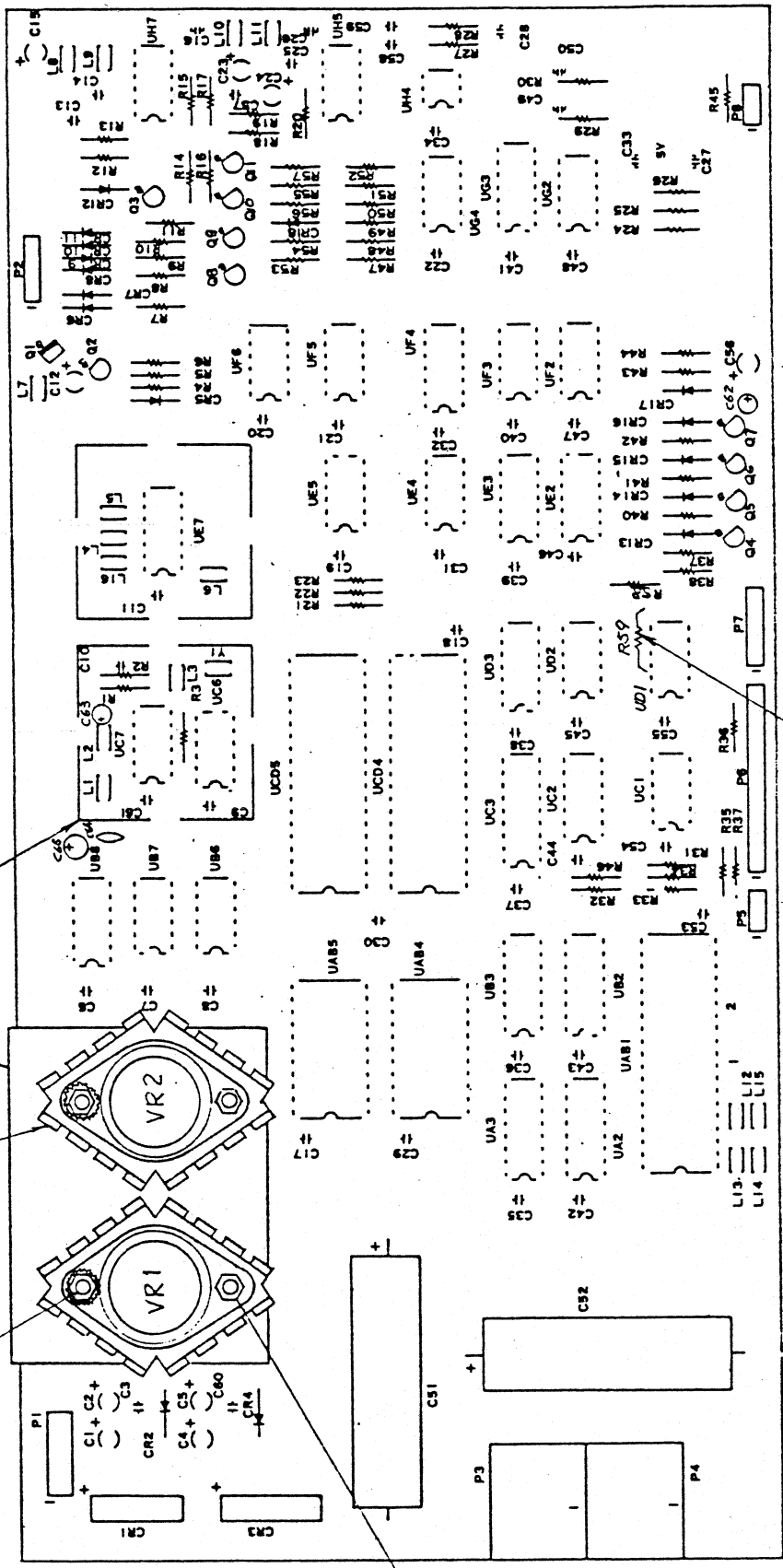
1. SHEET 6 OF 8 B-SIZE
 ASSY DWG.
 NOTES.

QUANTITY REQD PER PART/DASH NO.										QTY	U O	PART NUMBER	DESCRIPTION	REF. DES	BEND	NOTES
										37	B	902671	TRANSISTOR NPN 2SC945	Q2, Q3		SUBSTITUTION FOR ITEM 37
										38		902693-01	NPN 2SC1815	Q2, Q3		
										39		902679	NPN 2SD467	Q4-Q7		
										40		902682	NPN 2SC2120	Q4-Q7		SUBSTITUTION FOR ITEM 39
										41		902720	PNP 2SA673	Q1		
										42		902717	PNP 2SA733	Q8-Q11		
										43	B	902744-01	TRANSISTOR PNP 2SA1015	Q8-Q11		SUBSTITUTION FOR ITEM 42
										44	B	901522-30	IC 7407	UG4		SUBSTITUTION FOR ITEM 33
										45						
										46	B	900750-02	DIODE, SIGNAL IN4002	CR2, 4, 13-16		
										47		900850-05	SIGNAL WG 713C	CR6-11, 17, 18		
										48		900850-01	SIGNAL IN 4148	CR5		SUBSTITUTION FOR ITEM 47
										49		325505-01	ZENER 3.3V 500mW ±5%	CR5		HZ 3C-2
										50		325505-02	3.3V 500mW ±5%	CR5		HZ 4A-1 SUB. FOR ITEM 49
										51		900948-06	3.3V 500mW ±5%	CR5		IN 5226B SUB. FOR ITEM 49
										52		325506-01	5.1V 500mW ±5%	CR12		HZ 5C-2
										53		900948-11	ZENER 5.1V 500mW ±5%	CR12		IN 5231 SUB. FOR ITEM 52
										54		900756-01	BRIDGE 1.5A 50V	CR1		KBP-005
										55	B	900755-02	DIODE, BRIDGE 4A 50V	CR3		KBL-02
										56						
										57	B	900556-02	CRYSTAL 16MHz	Y1		
										58						
										59	B	325513-01	COIL, INDUCTOR 22uH	L1		
										60	B	325513-02	COIL, INDUCTOR 22uH	L8, L11		
										61	B	325513-03	COIL, INDUCTOR 100uH	L7, L9, L10		
										62						
										63	B	901528-04	VOLTAGE REGULATOR 12V 1.5A	VR1		LM340-12
										64	B	901528-01	VOLTAGE REGULATOR 5V 3A	VR2		LM323
										65	B	904914	INSULATION MYLAR T0-3			ATTACHED WITH VOLT REGULATOR
										66	B	325551-01	INSULATION SILICONE T0-3			SUBSTITUTION FOR ITEM 65.
										67						
										68	B	903361	CONNECTOR, DIN 6PIN	P3, P4		HOSHIDENKI TCS4460-01-101
										69						
										70	B	904150-06	SOCKET IC LOW PRO. 40PIN			
										71	B	904153-03	SOCKET IC LOW PRO. 24PIN			
										72						

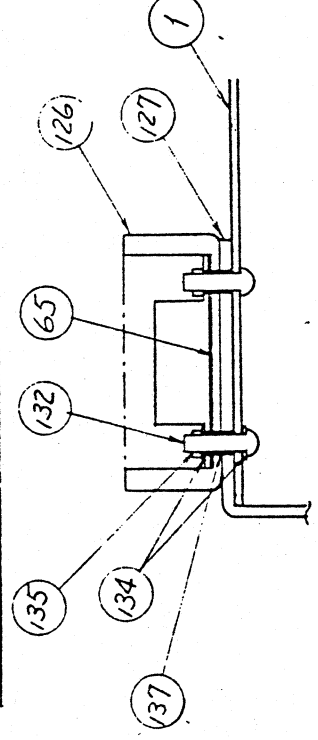
commodore	TITLE: PCB ASSY VIC-1540		DRAWN BY: J. J. J.	DATE: 1/1	CHKD: J. J. J.	DATE: 1/1	APPR: J. J. J.	DATE: 1/1	SIZE: B	1540001-	SHEET: 3 of 8

REVISIONS			DATE	APPROVED
LTR	ZONE	DESCRIPTION		
		SEE SHEET 1		

- 135
- 137
- 134 2 PLS
- 132
- 126
- 127
- 124 2 PL
- 125
- 135
- 132



DETAIL

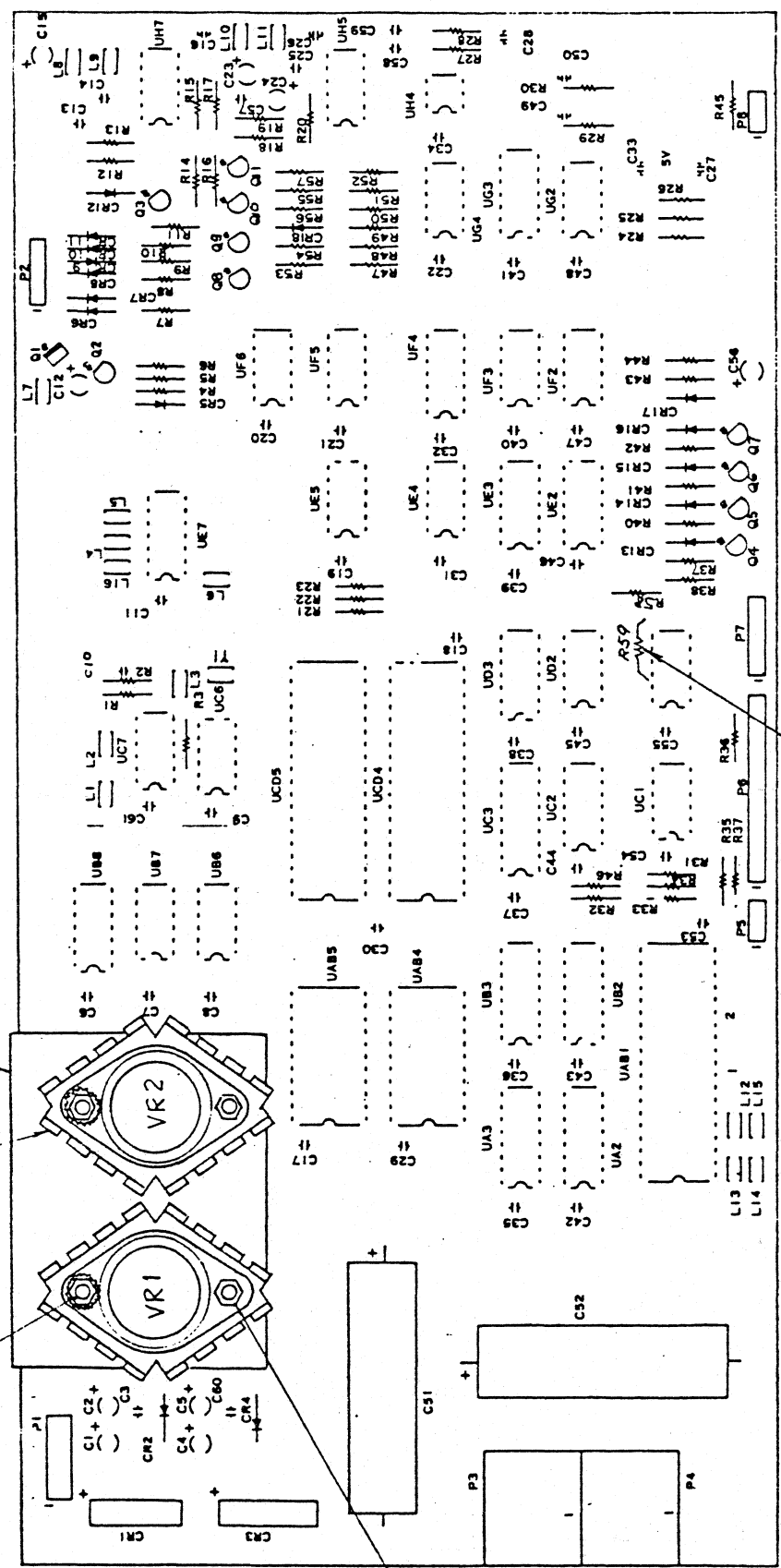


-01, -03 SHOWN

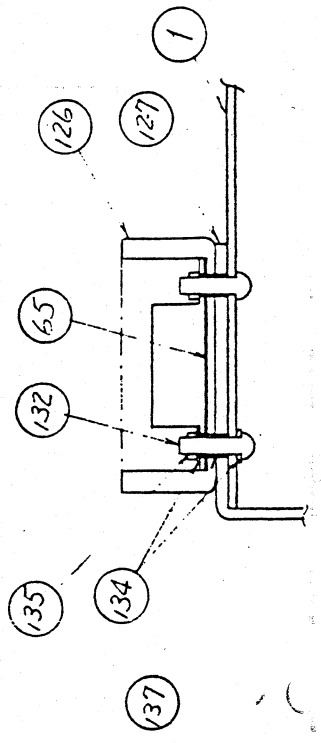
DRAWN BY: J. Takada		DATE: 8/1/81
CHECKED:	ENG'G:	APPR:
UNLESS OTHERWISE SPECIFIED TOLERANCES ON: DECIMALS: .X .XX .XXX .X'S		
MATERIAL:		USED ON: FCC VIC-1540 VIC-1541
NEXT ASSY:		
commodore		
PCB ASSY. VIC-1540		
SIZE: B	REV: 1540001	REV: F
SCALE: NONE		SHEET: 6 OF 8

REVISIONS

LTR	ZONE	DESCRIPTION	DATE	APPROVED
		SEE SHEET 1		



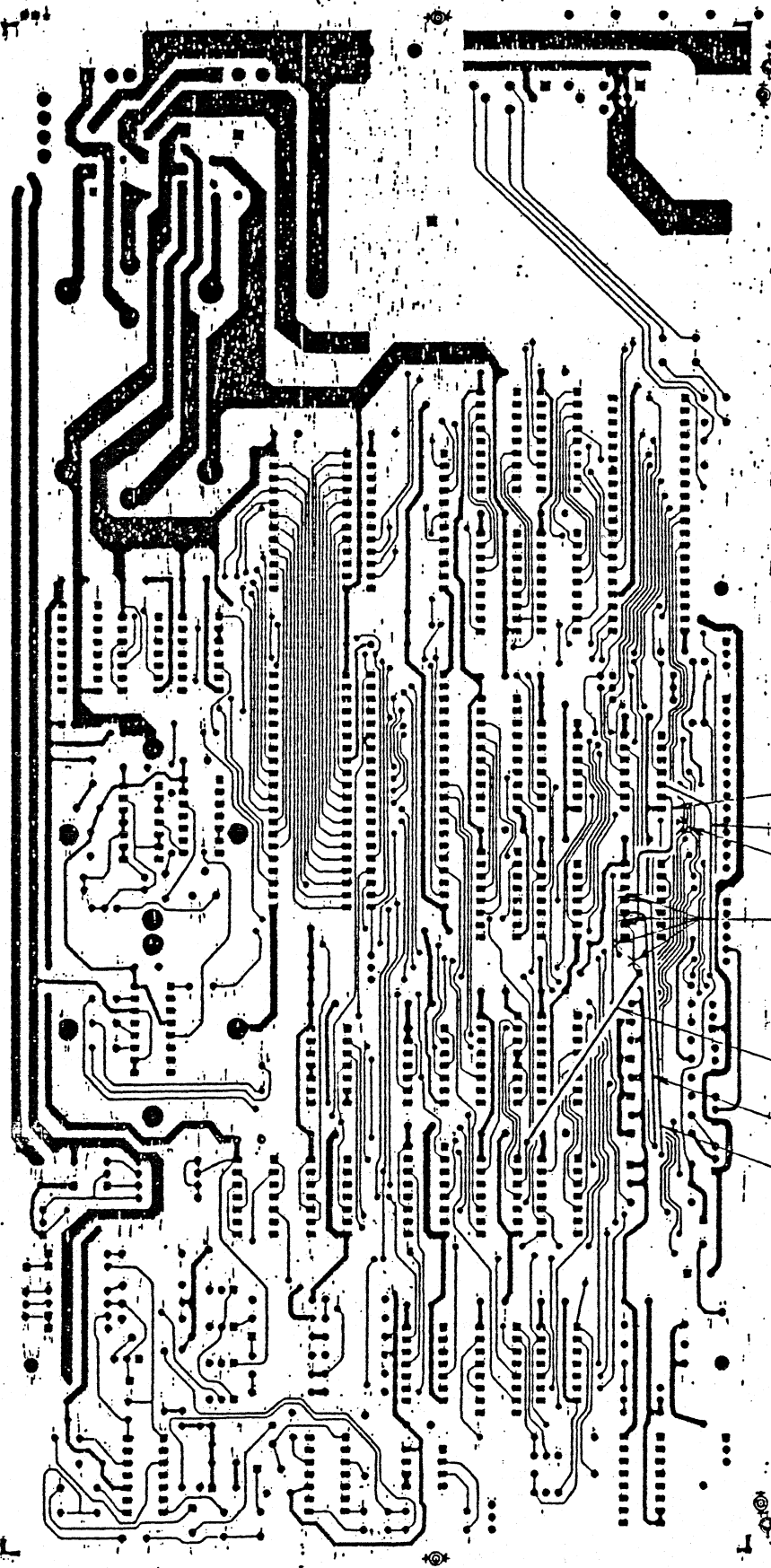
DETAIL



-02,-04 SHOWN

UNLESS OTHERWISE SPECIFIED TOLERANCES ON: DECIMALS		DATE	8/14/81
X	XX	XXX	
DRAWN BY: J. Zeigler		DATE	
CHECKED: ENGR		DATE	
APPROVED: APPR		DATE	
MATERIAL		USED ON	C-1540
FINISH		NEXT ASSY	
commodore		PCB ASSY.	
VIC-1540		SIZE	B
		REV	F
		1540001	

REVISIONS			
LTR	ZONE	DESCRIPTION	DATE
		SEE SHEET 1	



-01 TO -04 SHOWN

DRAWN BY: R. Lida		DATE: 11-25-8	commodore	
CHKD:	ENGR:	APP:	PCB ASSY	
TOLERANCES ON: DECIMALS .XX .XXX .X'S			VIC-1540	
MATERIAL:			USED ON: VIC/1540	NEXT ASSY: VIC/1541
FINISH:			SIZE: B	REV: F
SCALE: NONE			SHEET 8 OF 8	

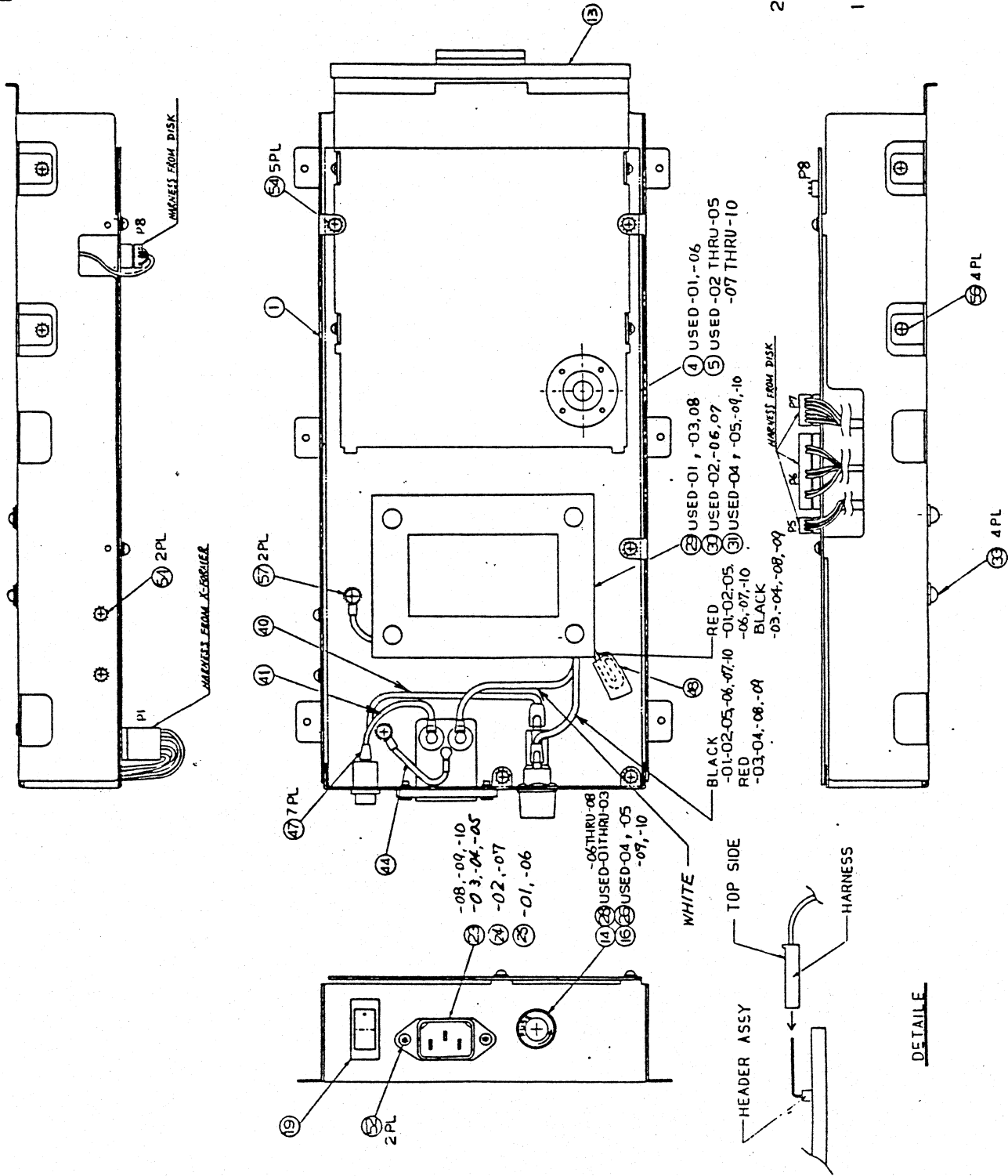
PART NO.	DESCRIPTION	REV	DATE	BY	REVISION	DATE	BY	REVISION
1540002 -01	POWER SUPPLY ASSY VIC-1540 UL							
-02	CSA							
-03	JPN							
-04	VDE							
1540002 -05	VIC-1540 PSI							
-06	1541 UL							
-07	CSA							
-08	JPN							
-09	VDE							
1540002 -10	POWER SUPPLY ASSY 1541 BSI							

4. NO CHANGE QTY FOR ITEM 54 IF USED ITEM 6 OR 7.
3. USE ONLY WHEN USED ITEM 8 OR 9.
2. IF ITEM 8 OR 9 ARE USED THEN QTY FOR ITEM 54 WILL CHANGE FROM 7 TO 9 PCS AND USED WITH ITEM 63.
1. SHEET 4 & 5 OF 5 ARE B-SIZE ASSY DWG. NOTES.

commodore	TITLE: POWER SUPPLY ASSY VIC-1540	DRAWN BY: Y. IMAGAWA	DATE: 7/1/81	DATE: 1/1	SIZE: B	SHEET: 1 OF 5
			CHKD: S. HARRIS	DATE: 1/1	1540002-	1 OF 5

QUANTITY REQD PER PART / DASH NO.										ITEM	QTY	PART NUMBER	DESCRIPTION	REF. DES	BEND	NOTES
10	09	08	07	06	05	04	03	02	01	1	D	15400012	POWER CHASSIS			SUBSTITUTE FOR ITEM 2, SEE NOTE 2
										2	D	251153	POWER CHASSIS			SEE NOTE 3
										3						
										4	B	1540001 -01	PCB ASSY (FCC) UL			
										5	B	1540001 -02	PCB ASSY			
										6	B	1540001 -03	PCB ASSY (FCC) UL			
										7	B	1540001 -04	PCB ASSY			SUBSTITUTE FOR ITEM 8
										8	B	1540048 -01	PCB ASSY (FCC) UL			SUBSTITUTE FOR ITEM 9
										9	B	1540048 -02	PCB ASSY			USED LOGIC ARRAY
										10						USED LOGIC ARRAY
										11						
										12	B	325519 -01	FLOPPY DISK (BLACK)			SUBSTITUTE FOR ITEM 13
										13	B	325519 -02	FLOPPY DISK (BROWN)			
										14	B	903614 -01	FUSE HOLDER FH Q32			
										15						
										16	B	903615 -01	FUSE HOLDER FH Q33			
										17						
										18						
										19	B	904509 -01	SWITCH, ROCKER	SW I		
										20						
										21	B	325552 -01	FILTER POWER CONNECTOR			SUBSTITUTE FOR ITEM 23 (TOKIN)
										22	B	903467 -01	FILTER POWER CONNECTOR			SUBSTITUTE FOR ITEM 23
										23	B	903467 -02	FILTER POWER CONNECTOR			
										24	B	903350 -01	POWER CONNECTOR			SUBSTITUTE FOR ITEM 23 (MAMI PA-126)
										25	B	903467 -03	FILTER POWER CONNECTOR			
										26	B	903559 -02	FUSE, SLO BLO 250V 0.5A			5.2" x 20mm
										27	B	903555 -20	FUSE, SLO BLO 250V 1.0A			6.3" x 30mm, SUBSTITUTE FOR ITEM 28
										28	B	903556 -16	FUSE, NORMAL BLO 250V 1.0A			6.3" x 30mm
										29	C	1540009 -01	POWER TRANSFORMER J/S	T 1		
										30	C	1540009 -02	POWER TRANSFORMER UL CSA J/S	T 1		SUBSTITUTE FOR ITEM 29
										31	C	1540009 -03	POWER TRANSFORMER VDE 240/220V	T 1		
										32						
										33	B	325548 -04	SCREW PAN HEAD WITH SPRING WASHER MS-10			TO BE ATTACHED WITH X-FORMER
										34						
										35						
										36						
commodore										TITLE:			POWER SUPPLY ASSY V10-1540			
										DRAWN BY:			Y. IMAGAWA		DATE	
										CHKD: E. J. J. J.			8/2/81		APPR:	
													DATE		SIZE	
													11		B	
													11		1540002 -	
													11		2 OF 5	

REVISIONS			DATE	APPROVED
LTR	ZONE	DESCRIPTION		
		SEE SHEET 1		



1. ALL OF HARNESS EXCEPT P1 SHOULD BE CONNECTED TO EACH HEADER ASSY (SEE DETAIL).
2. ALL LEADS WILL HAVE A MINIMUM OF ONE WRAP AROUND TERMINALS PRIOR TO SOLDERING.

commodore		POWER SUPPLY ASSY	
1540002	M	1540002	M

[illegible]

QUANTITY REQD PER PART / DASH NO.										ITEM	DS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES
									0201							
									11	1	B	1540050	PC BOARD 238 x155 x1.6t			GLASS EPOXY. G-10
										2						
										3						
										4						
										REF 5	C	1540049-01	SCHEMATIC DIAGRAM			USED LOGIC ARRAY. FCC (UL)
										REF 6	C	1540049-02	SCHEMATIC DIAGRAM			USED LOGIC ARRAY.
										7						
										8						
										9						
										10						
										11						
										12	B	901435-01	IC MPS 6502 CPU	UC4		
										22	13	901437-01	MPS 6522 VIA	UC2, UC3		
										11	14	901229-03	2364-197 ROM	UB4		\$E000 ~ \$FFFF
										11	15	325302-01	2364-130 ROM	UB3		\$C000 ~ \$DFFF
										11	16	325572-01	LOGIC ARRAY 40 PIN DIP	UC1		
										11	17	901521-01	74LS00 2-NAND	UC6		
										11	18	901521-17	74LS42 DEC.	UC7		
										11	19	901522-01	7417 BUFFER	UD2		
										11	20	901521-32	74LS86 2-EX-OR	UD3		
										22	21	901522-06	7406 INV. BUF.	UB1, UD1		
										11	22	901521-02	74LS04 INV.	UC5		
										11	23	901521-30	74LS14 SCH. INV.	UA1		
										11	24	901521-26	74LS193 4 BIT. COU.	UE6		
										11	25	901521-54	74LS197	UD5		
										S S	26	901522-03	74177	UD5		SUBSTITUTE FOR ITEM 25.
										11	27	901510-01	9602	UD4		
										11	28	901523-04	LM311	UE4		
										22	29	901523-08	IC NE592	UF3, UF4		
										11	30	325502-03	IC TMM2016P RAM	UB2		
										S S	31	325502-01	IC M58725P RAM	UB2		SUBSTITUTE FOR ITEM 30.
										S S	32	901522-30	IC 7407	UD2		SUBSTITUTE FOR ITEM 19.
										33						
										34						
										35						
										36						
										37						

PART NO.	DESCRIPTION
1540048-01	FCC (UL) PCB ASSY. VIC-1541. USED LOGIC ARRAY.
1540048-02	PCB ASSY. VIC-1541. USED LOGIC ARRAY.

[Fold Here]

DWG. NO. 1540048

TITLE: PCB ASSY. VIC-1541.

REVISIONS				
LTR	ZONE	DESCRIPTION	DATE	APPROVED
A		PRODUCTION RELEASE	12/18/82	T. MATSUMOTO
B		REVISED PER ECO-830085	2/28/83	J. Okada
C		REVISED PER ECO 830125	3/25/83	J. Okada

1. SHEET 7 ~~8~~ OF 8 ARE B-SIZE
ASSY DWG
NOTES-UNLESS OTHERWISE SPECIFIED:

VC-1541

commodore	DRAWN BY: T. Tokuda	DATE: 11/16/82	ENGR: T. MATSUMOTO	12/17/82	SIZE: B	SHEET: 1 OF 8
	CHKD:		APPR: ✓	12/18/82		

QUANTITY REQD PER PART / DASH NO.														ITEM	DS	PART NUMBER	DESCRIPTION	REF DES	BEND	NOTES																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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QUANTITY RECD PER PART / DASH NO.														ITEM	DS	PART NUMBER	DESCRIPTION	REF DES	BEND		NOTES		
														OZ	01								
																112	B	900301-04	CAPACITOR ELECT.	220μF/10V	C13		
																113		900101-45		6800μF/25V	C17		
																114		900101-32		4700μF/16V	C16		
																215		900100-33		47μF/16V	C2,C5		
																216		900100-32	ELECT.	1μF/25V	C1,C4		
																117		900402-15	TANTALIUM	10μF/25V	C15		
																118		900402-11	TANTALIUM	3.3μF/25V	C44		
																119		900010-52	CERAMIC	150pF/50V	C31	±5%	
																2120		-53		330pF/50V	C32,C36	±5%	
																3121		-54		680pF/50V	C45,C33,C34	±5%	
																1122		-25		1000pF/50V	C41		
																24123		-20		0.1μF/50V	C3.6-10	14,18,19,20,22-30,35,40,43,47,48	
																2124		900010-14	CERAMIC	0.022μF/50V	C39,C42		
																1125		900100-40	ELECT.	100μF/16V	C46		
																2126		900402-17	TANTALIUM	0.47μF/25V	C37,C38		
																1127		-08		4.7μF/25V	C21		
																1128		900402-14	TANTALIUM	1μF/16V	C11		
																1129	B	900465-02	CAPACITOR CERAMIC	0.033μF/25V	C12		
																130							
																131							
																132							
																133							
																1134	B	901550-56	RESISTOR CARBON 1/4W±5%	47Ω	R1		
																2135	B	901550-108	RESISTOR CARBON 1/4W±5%	360Ω	R14,R24		
																4136		-89		150Ω	R17,18,45,46		
																4137		-52		220Ω	R4,16,36,55		
																2138		-14		330Ω	R3,R23		
																6139		-58		470Ω	R20,22,30,37,38	41	
																1140		-38		510Ω	R27		
																6141		-31		680Ω	R31,42,47-50		
																6142		-01		1KΩ	R2,5,6,7,8,43		
																3143		-53		2KΩ	R9,10,26		
																6144		-18		2.2KΩ	R11,19,21,32-34		
																1145		-69		1.5KΩ	R40		
																4146		-12		22KΩ	R12,35,39,52		
																2147	B	901550-07	RESISTOR CARBON 1/4W±5%	100KΩ	R25,R44		
																148							

commodore

TITLE:
PCB ASSY. VIC-1541

DRWN BY:
T. Tokuda
CHKD:

DATE
11/16/82

ENGR: 40
APPR: T.M

DATE
12/7
12/18

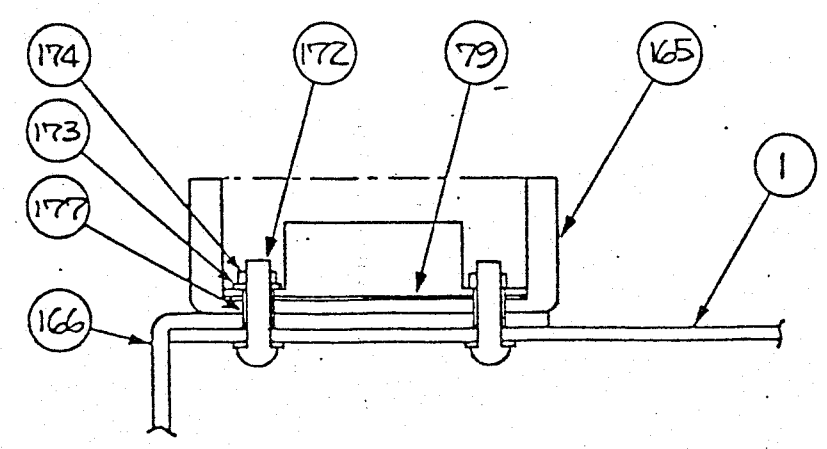
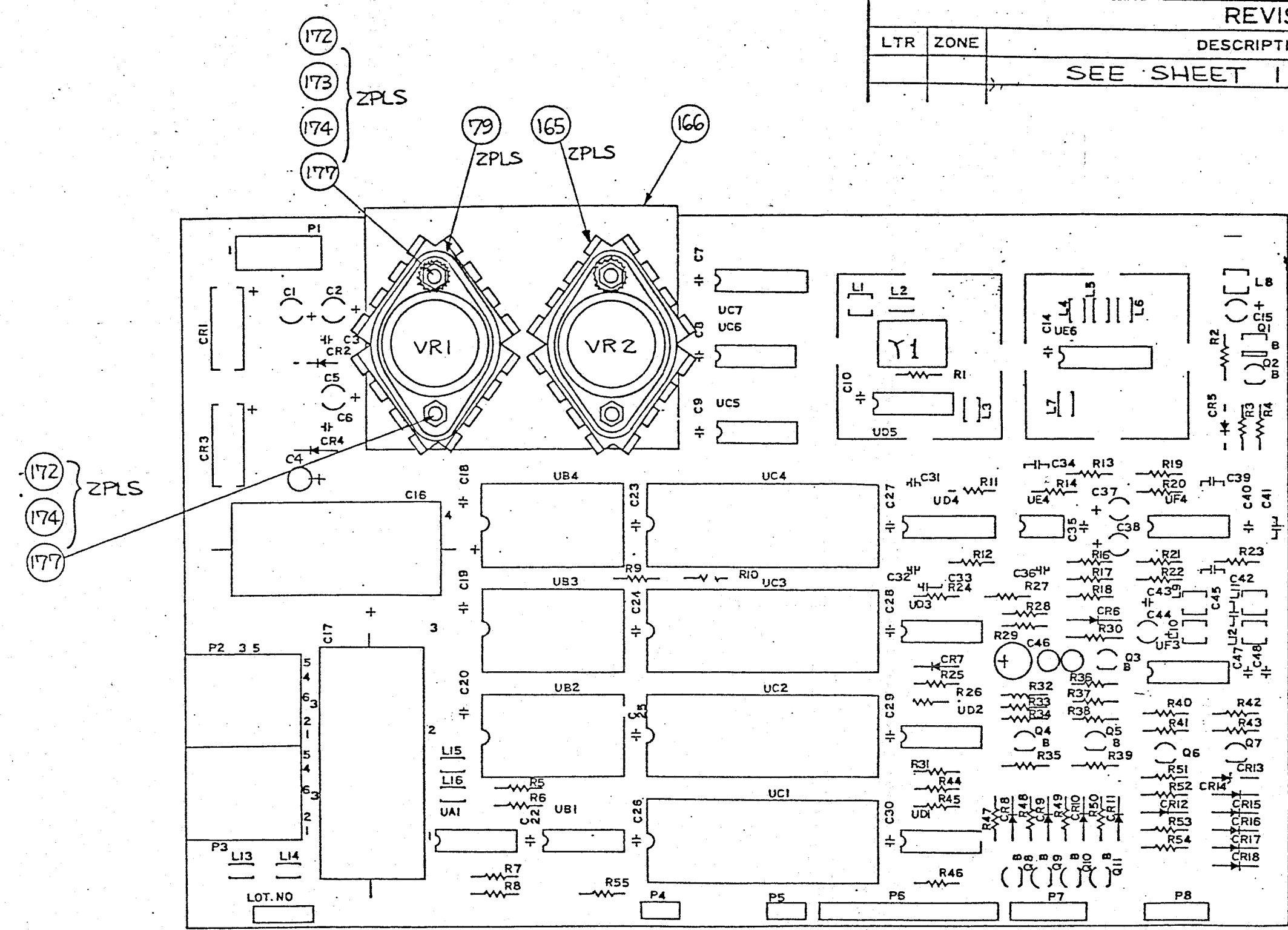
SIZE
B

1540048

REV
C

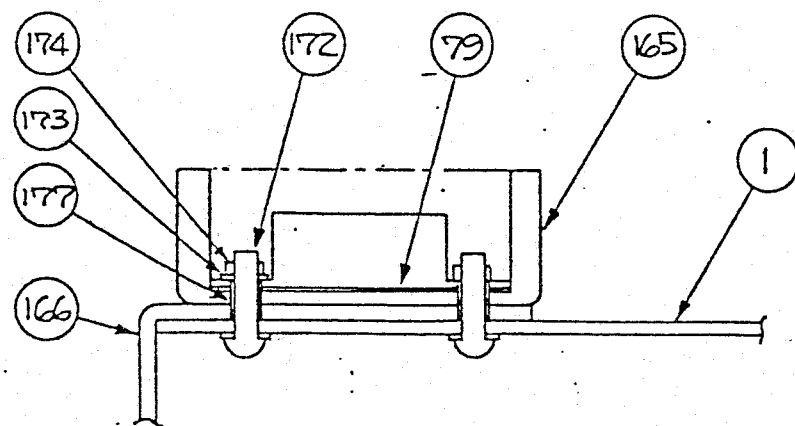
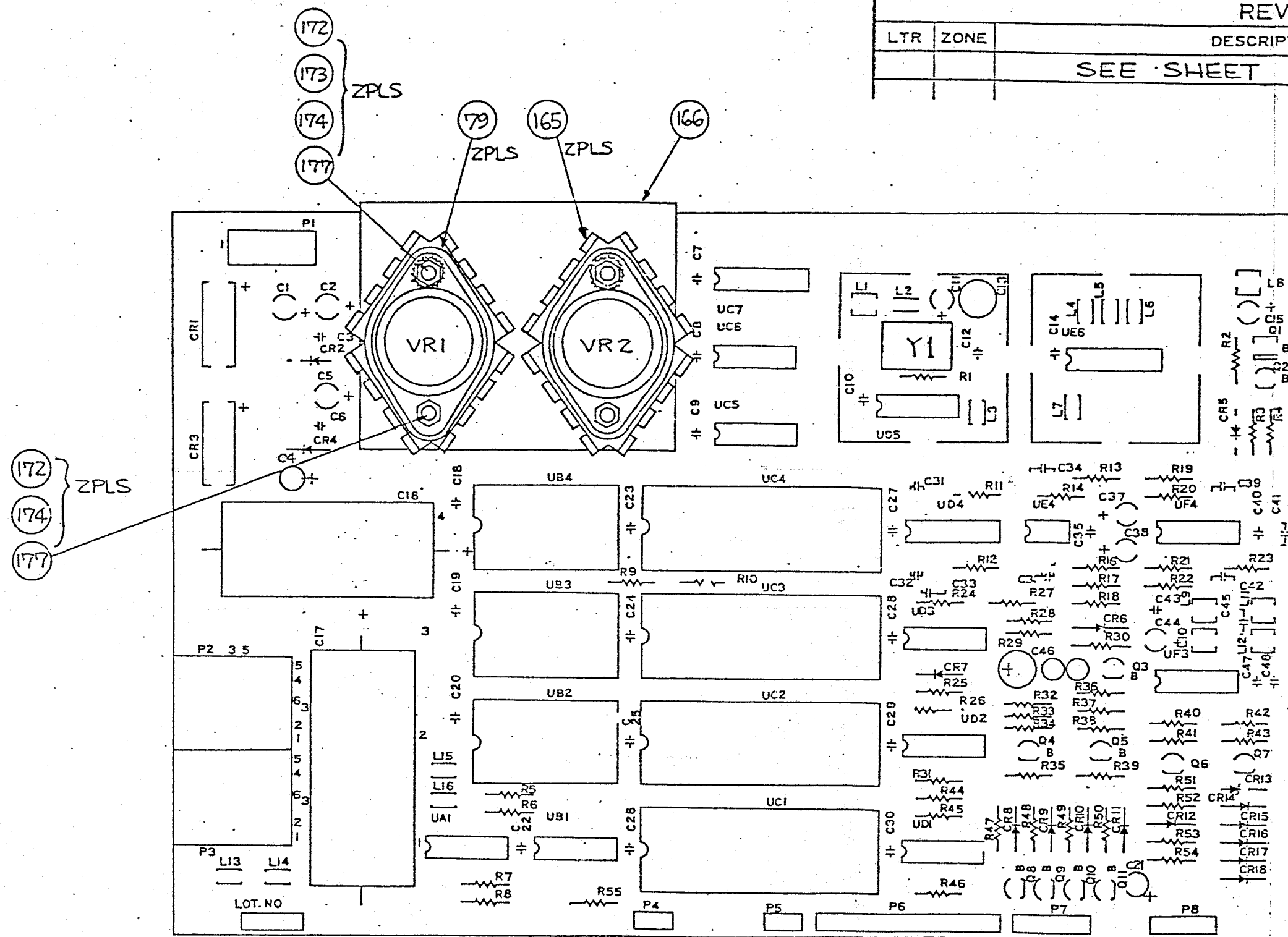
SHT
5/8

REVISIONS				
LTR	ZONE	DESCRIPTION	DATE	APPROVED
		SEE SHEET 1		



UNLESS OTHERWISE SPECIFIED TOLERANCES ON: DECIMALS		DRAWN BY: K. Maryama		DATE 12/16/82	
.X	.XX	.XXX	CHKD: T. Zoluda		12/17/82
±	±	±	ENGR: JLG		12/18/82
MATERIAL:			APPR: T. Maryama		
FINISH:			USED ON VIC-1541		
			NEXT ASSY		
<div> <div>commodore</div> <div>P.C.B. ASSY VIC-1541</div> </div>					
SIZE B	1540048-02				REV C
SCALE NONE SHEET 8 OF 8					

REVISIONS				
LTR	ZONE	DESCRIPTION	DATE	APPROVED
SEE SHEET 1				



UNLESS OTHERWISE SPECIFIED TOLERANCES ON: DECIMALS		DRAWN BY: K. Maruyama		DATE: 12/6/82	
.X .XX .XXX L'S		CHKD: T. Tokuda		12/7/82	
± ± ± ±		ENGR: J. Matsuda		12/8/82	
MATERIAL:		APPR: J. Matsuda			
FINISH:		USED ON: VIC-1541		NEXT ASSY:	
commodore				P C B ASSY VIC-1541	
				SIZE B 1540.048-01 REV C	

QUANTITY REQD PER PART / DASH NO.										ITEM	PART NUMBER	DESCRIPTION	REF. DES	BEND	NOTES
-10	-09	-08	-07	-06	-05	-04	-03	-02	-01						
										37					
										38					
										39					
									1	40 B	1540017 - 01	LABEL RATING VIC-1540			UL, CSA
								1		41	-02	VIC-1540			JIS
										42	-03	VC -1540			VDE
										43	1540017 - 04	VIC-1540			BSI
										44	1540030 - 01				NOT LISTED UL & CSA. SEE NOTE 3. SUB. FOR ITEM 48.
										45	-02				JIS
										46	-03				VDE
										47	-04				BSI
										48 B	1540030 - 06	LABEL RATING 1541			LISTED UL. SEE NOTE 3.
										49					
										50					
										51					
										52 B	1010019 - 01	LABEL WARNING, FUSE REPLACEMENT			ENGLISH 250V 1A
										53 B	1010019 - 02	LABEL WARNING, FUSE REPLACEMENT			ENGLISH 250V 0.5A
										54 B	4022055	LABEL WARNING, FUSE REPLACEMENT			FRENCH 250V 1A
										55 B	4022056	LABEL WARNING CSA			2
										56 B	320955 - 02	LABEL, FCC ID			
										57 B	325553	LABEL, FCC CLASS B			2
										58 B	320955 - 14	LABEL, FCC ID			
										59					
										60					
										61 B	206800 - 02	SCREW PAN HEAD M3x10			
										62					
										63 B	251185 - 01	TOP CASE ASSY			
										64					
										65					
										66					
										67					
										68					
										69					
										70					
										71					
										72					

commodore

MAIN ASSY 1541

TITLE:

DATE: 8/10/82

DRAWN BY: K. Hanyama

CHKD: T. Tokuda

1540005

B

DATE: 1/1

SIZE: 3.65/82

1540005

3 of 4

1. FLOPPY DISK DRIVE

1. THIS SPECIFICATION DESCRIBES A THIN MINIFLOPPY DISK DRIVE FOR USE IN COMPUTER SYSTEM.

2. GENERAL SPECIFICATION

2-1 CAPACITY (UNFORMATTED)

MEDIA 201K BYTE
TRACK 5000 ~ 6153 BYTE

2-2 SECTOR METHOD SOFT
2-3 SPINDLE ACTUATOR BELT
2-4 HEAD POSITIONING METHOD METAL BAND
2-5 ROTATIONAL SPEED 300 RPM
2-6 TRACK DENSITY 48 TPI
2-7 NUMBER OF TRACKS 35 (40 MAX)
2-8 TRANSFER RATE 250K BIT/S
2-9 RECORDING METHOD GCR
2-10 ACCESS TIME

TRACK TO TRACK 12M SEC
SETTLING 15M SEC
2-11 MOTOR START TIME 1 SEC MAX

3. ENVIRONMENTAL

3-1 TEMPERATURE
OPERATING 10 ~ 47°C
STORAGE -22 ~ 60°C

3-2 HUMIDITY (WITHOUT CONDENSATION)
OPERATING 20 ~ 80 %RH
STORAGE 1 ~ 95 %RH

4. RELIABILITY

4-1 ERROR RATE
SOFT READ ERRORS 1×10^{-9} /BIT
SEEK ERRORS 1×10^{-6} /SEEKS
4-2 MTBF (MOTOR ON DUTY 20%) 8×10^3 HOURS
4-3 MEDIA LIFE 3×10^6 PASSES PER TRACK

REVISIONS

LTR	ZONE	DESCRIPTION	DATE	APPROVED
A		PRODUCTION RELEASE	3-15-89	<i>[Signature]</i>
B		REVISED PER ECO 840312	7-10-89	<i>[Signature]</i>

5. POWER
5-1 12±0.6 V DC 1.8 A MAX.
6. MOUNTING
6-1 TOP LOADING YES
FRONT LOADING YES
DISKETTE VERTICAL YES
DISKETTE HORIZONTAL YES
STEPPING MOTOR UP 110
STEPPING MOTOR DOWN YES
7. HEAD
SINGLE R/W GAP WITH SEPARATE STRADDLE ERASE
7-1 WRITE CURRENT 7 MA P-P
7-2 ERASE CORRENT 40 MA
7-3 READ OUTPUT 190MV P-P MIN.
(THROUGH 1541 AMP.) AT 5162 FCI (TR.34)
1.4VP-P MAX.
AT 1768 FCI (TR.00)
7-4 RESOLUTION
EOUT 5162 FCI
EOUT 2521 FCI ≥ 0.55 (TR.34)
EOUT 3536 FCI
EOUT 1768 FCI ≤ 0.95 (TR.00)

8. STEPPING MOTOR
8-1 ONE STEP ANGLE 1.8°
8-2 OPERATING VOLTAGE 12V ±10% DC
8-3 MOTOR CURRENT PER PHASE 400 MA MAX.
8-4 DRIVE MODE 1 PHASE
9. SPINDLE MOTOR
9-1 MOTOR SPEED 2340 RPM
9-2 STALL CURRENT 1.1 A
9-3 DRIFT
INITIAL 300RPM ±1.5%
LONG TIME 300RPM ±2.9%
10. PHYSICAL DIMENTION (INCLUSIVE OF FRONT PANEL)
10-1 HEIGHT 42.9 MM
10-2 WIDTH 193 MM
10-3 LENGTH 149.3 MM
10-4 WEIGHT 950 G (2.09 POUND) MAX.
11. TRACK ØØ LIMITER
+0.25 MM (+0.01 IN)
+0.1 MM (+0.004 IN)

UNLESS OTHERWISE SPECIFIED TOLERANCES ON: DECIMALS .XX .XXX .4'S		DRAWN BY: N. Hanamura	DATE: 1-10-89	commodore FLOPPY DISK NEWTRONICS
X XX XXX .4'S		CHKD: <i>[Signature]</i>	3/13/89	
MATERIAL:		ENGR: <i>[Signature]</i>	3-14-89	
FINISH:		APPR: <i>[Signature]</i>	3-14-89	
		USED ON:	NEXT ASSY:	SIZE B 251643 SCALE NONE SHEET 1 OF 5

2. HEAD ASSEMBLY

1. SCOPE

THIS SPECIFICATION DESCRIBES A HEAD ASSEMBLY FOR USE D500 FLOPPY DISK DRIVE.

2. PHYSICAL

- 2-1 HEAD TYPE SINGLE R/W GAP SEPARATE STRADDLE ERASE
- 2-2 HEAD/MEDIA INTERFACE 1/NC CONTACT, CERAMIC AND FERRITE WEAR SURFACES
- 2-3 READ/WRITE GAP 100 MICRO INCHES
- 2-4 CLEANING THE HEAD CONSTRUCTION SHALL ALLOW PERIODIC CLEANING WITH METHYL-ALCOHOL OR 1-1-1 TRICHLOROETHANE WITHOUT HARM.

3. PERFORMANCE

- 3-1 TEMPERATURE RANGE OPERATING 0~52°C
STORAGE -45~+71°C
- 3-2 HUMIDITY RANGE OPERATING 8~80% RH
STORAGE NO CONDITIONING
- 3-3 DESIGN LIFE 1600 HOURS IN CONTACT WITH DISKETTE AT 18 G PRESSURE PAD FORCE
- 3-4 PRESSURE PAD FORCE 18 ± 2 G A 0.197" DIAMETER PAD
- 3-5 RECORDING METHOD GCR
- 3-6 RECORDING MEDIA DATALIFE MD525-01
- 3-7 HEAD/MEDIA VELOCITY 45~70.7 INCHES/SEC, AT 300 RPM
- 3-8 DATA PACKING DENSITY UP TO 5536 FCI AT 300 RPM ON TRACK 39
- 3-9 WRITE CURRENT 7 MA P-P
- 3-10 ERASE CURRENT 40 MA
- 3-11 READ OUTPUT 190 MV P-P MIN. AT 5162 FCI (TR. 34)
(THROUGH 1541 AMP) 1.4 VP-P MAX. AT 1768 FCI (TR. 00)

REVISIONS

LTR	ZONE	DESCRIPTION	DATE	APPROVED
		SEE SHEET 1		

3-12 RESOLUTION

EOUT	5162	FCI	≥ 0.55 (TR. 34)
EOUT	2581	FCI	≥
EOUT	3536	FCI	≤ 0.95 (TR. 00)
EOUT	1768	FCI	≥

3-13 OVERWRITE MODULATION

WRITE 1F (1768 FCI).
THEN WRITE 2F (3536 FCI)
THE RATIO OF 2F AMPLITUDE TO
REMAINING (OVERWRITTEN) 1F IS
30 DB MIN.

4. ELECTRICAL

4-1 INDUCTANCE

READ/WRITE, PER LEG 600 ± 120 μH
BALANCE, LEG TO LEG 1 ± 0.2
ERASE 1.5 MH

4-2 RESISTANCE

READ/WRITE, PER LEG 25 OHMS MAX.
ERASE 20 OHMS MAX.

4-3 RESONANCE FREQUENCY

400 KHZ MIN.

4-4 INSULATION RESISTANCE

50 MOHMS MIN. (100V DC)

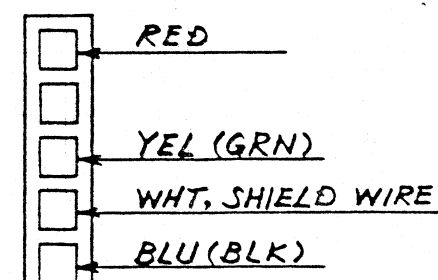
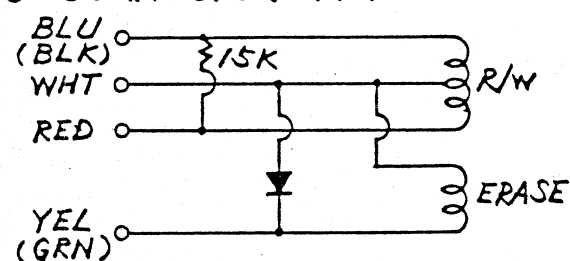
4-5 GROUNDING

BETWEEN COILS AND CORE
BACK BAR OF R/W CORE SHALL BE
ELECTRICALLY BONDED TO R/W
CENTER TAP

5. TEST CONDITIONS

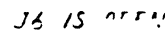
THE AMPLIFIER WHICH WILL BE USED TO TEST READ/WRITE
PARAMETERS SHALL HAVE AN INPUT IMPEDANCE OF 15 KOHMS
SHUNTED BY 20 PF

6. CONNECTOR PIN



HOUSING
HIROSE HIF 36-55-259C
OR EQUIVALENT
TERMINAL
HIROSE HIF 3-2428SCFA
OR EQUIVALENT

UNLESS OTHERWISE SPECIFIED TOLERANCES ON: DECIMALS XX XXX ±		DRAWN BY: N. Hanamura CHKD: 2KH 4N ENGR: S. Takahashi APPR: 3/14/84		DATE: 1-11-84 3/13/84 3-14-84		commodore	
MATERIAL:		USED ON:		NEXT ASSY:		FLOPPY DISK NEWTRONICS	
FINISH:						SIZE B 251643 REV B	
						SCALE NONE SHEET 3 OF 5	



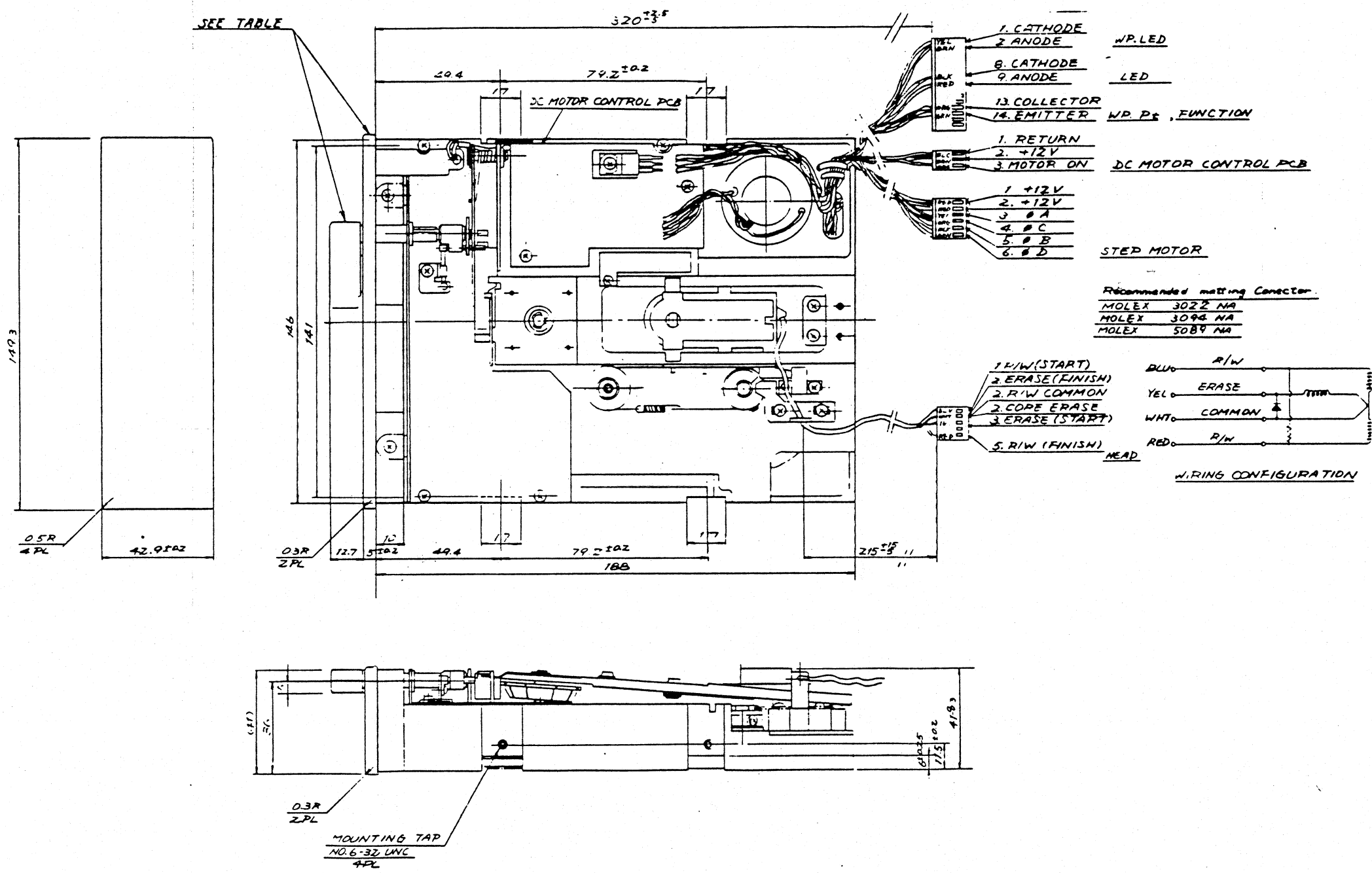
commodore

SCHEMATIC DIAGRAM,
SINGLE FLOPPY CONTROLLER

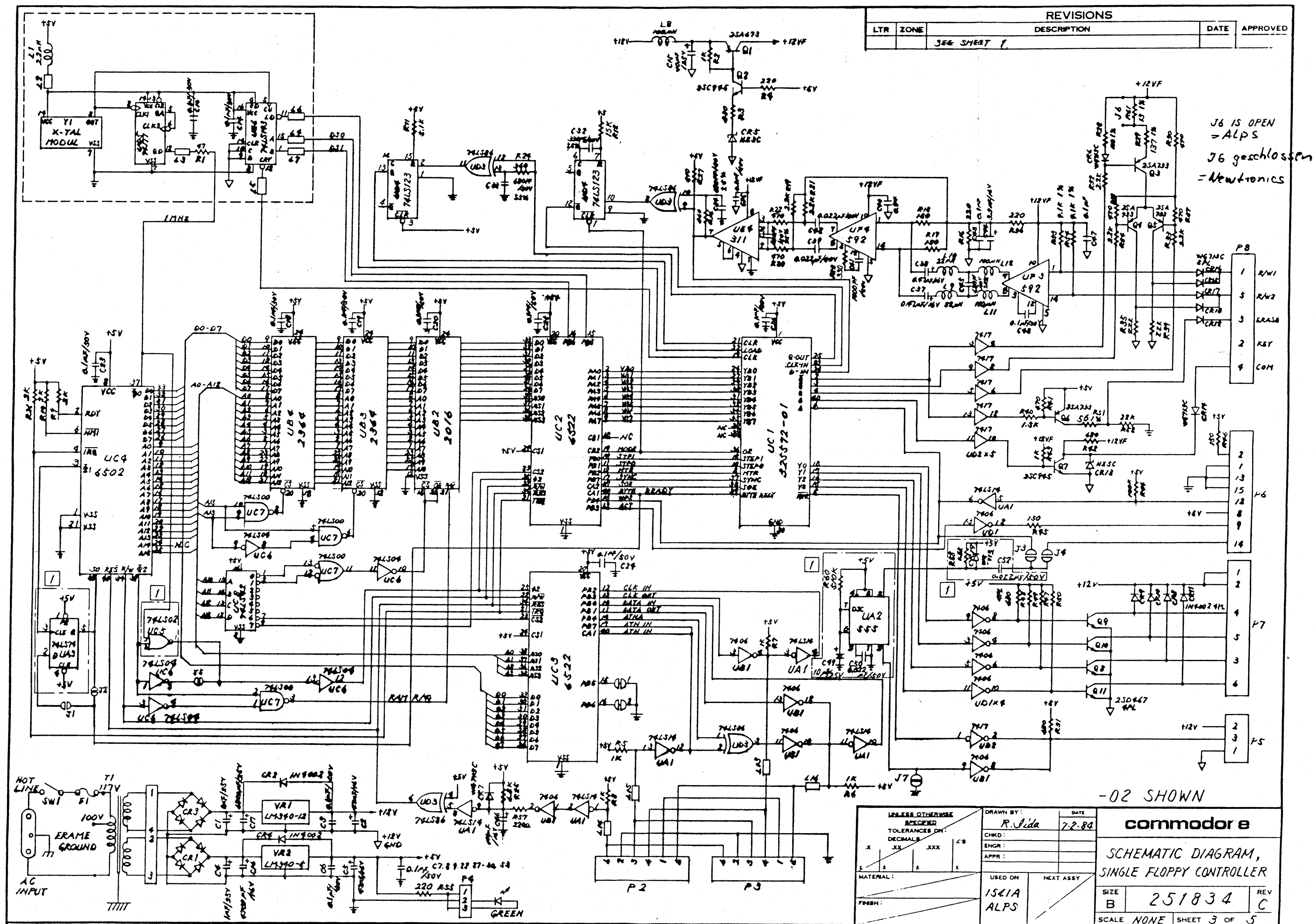
SIZE B	251748	REV F
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PART NO.	COLOR
251643-01	BROWN
251643-02	DARK GREY

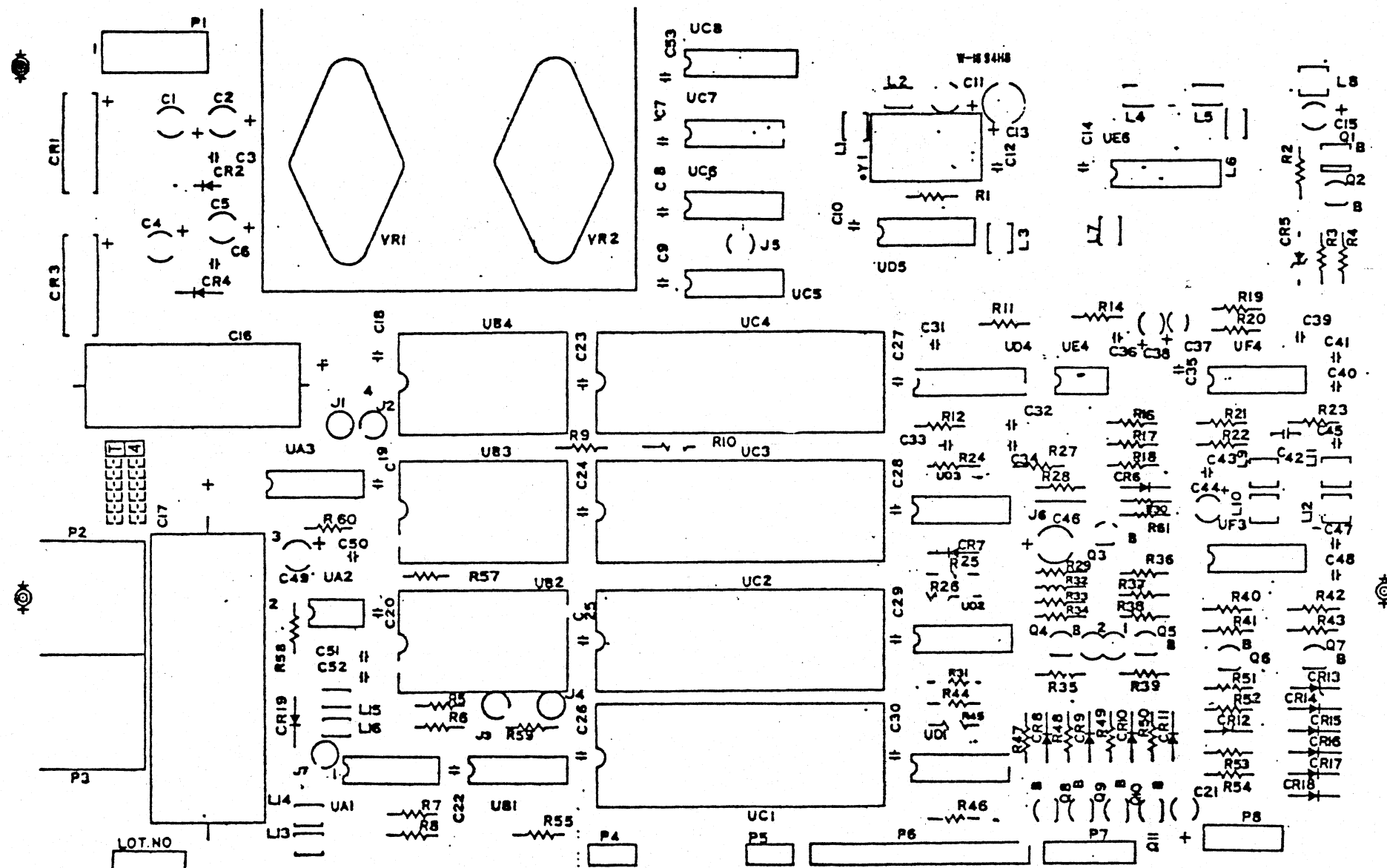
REVISIONS		
LTR ZONE	DESCRIPTION	DATE APPROVED
/ SEE SHEET 1		



RELEASE & RETURN PROJECT NO. TELEPHONE NO. DEPARTMENT		DRAWN BY <i>X. Tabass</i>	DATE 10-5-83	COMMODORE FLOPPY DISK NEWTRONICS
CHECKED BY <i>ALB. IN.</i>		ENGINEER <i>ALB. IN.</i>	APPROVED <i>ALB. IN.</i>	
MATERIAL	USED ON	NEXT ASSY	SIZE D 251643	REV B
SCALE NONE SHEET 5 OF 5				



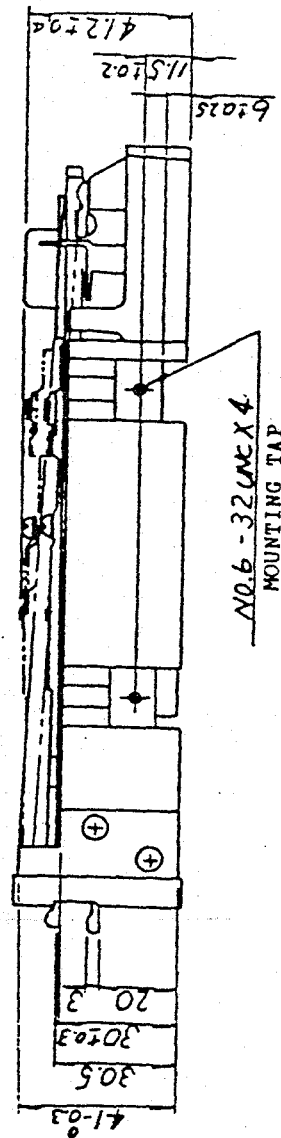
REVISIONS			
LTR	ZONE	DESCRIPTION	DATE
		SEE SHEET 1	



SILKSCREEN

251834 C

UNLESS OTHERWISE SPECIFIED TOLERANCES ON: DECIMALS .XX .XXX .4"		DRAWN BY: <i>[Signature]</i> DATE: 5-22-88	
MATERIAL:		CHKD: <i>[Signature]</i> 5-28-88	
FINISH:		ENGR: <i>[Signature]</i> 5-28-88	
		APPR: <i>[Signature]</i> 5-31-88	
		USED ON	NEXT ASSY
		commodore	
		PCB, 1541A-2	
SIZE B	251830	REV A	
SCALE NONE		SHEET 4 OF 6	



TOLERANCES UNLESS OTHERWISE SPEC.		CUSTOMER		CUSTOMER P/N		SAMPLE NO	
BASIC DIMENSIONS	TOLERANCES	Jエドール ジャパン (株)				E6164912M	
UP TO 10	± 0.3			UNIT	SCALE	IDM 2224	
BETWEEN 10 TO 100	± 0.5			APPR.	USGD.	TITLE ASSEMBLY DRAWING	
ABOVE 100	± 0.8			Aug 21 1958	Aug 25 1958	DOCUMENT NO.	
ANGULAR DIMENSIONS $\pm 3'$		ZONE	SYMB	DATE	APP	AKD	DSGD
		(6)		SEP 20 1958			

NOTES 1. APPLY THE SPEC. OF FDM2224.

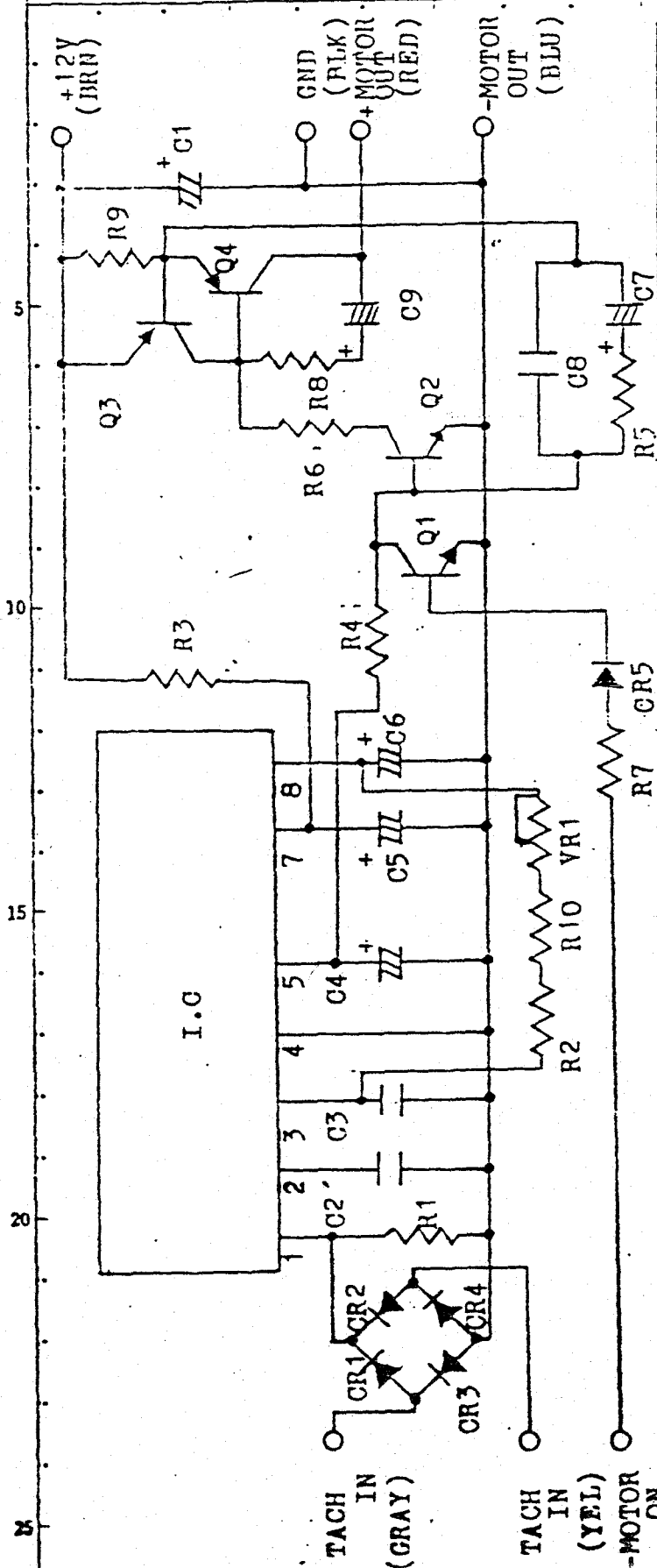
SLV 5. NO.

TITLE

FLOPPY DISK DRIVE SPECIFICATION

FDM2224

4. Motor Control P.C.B

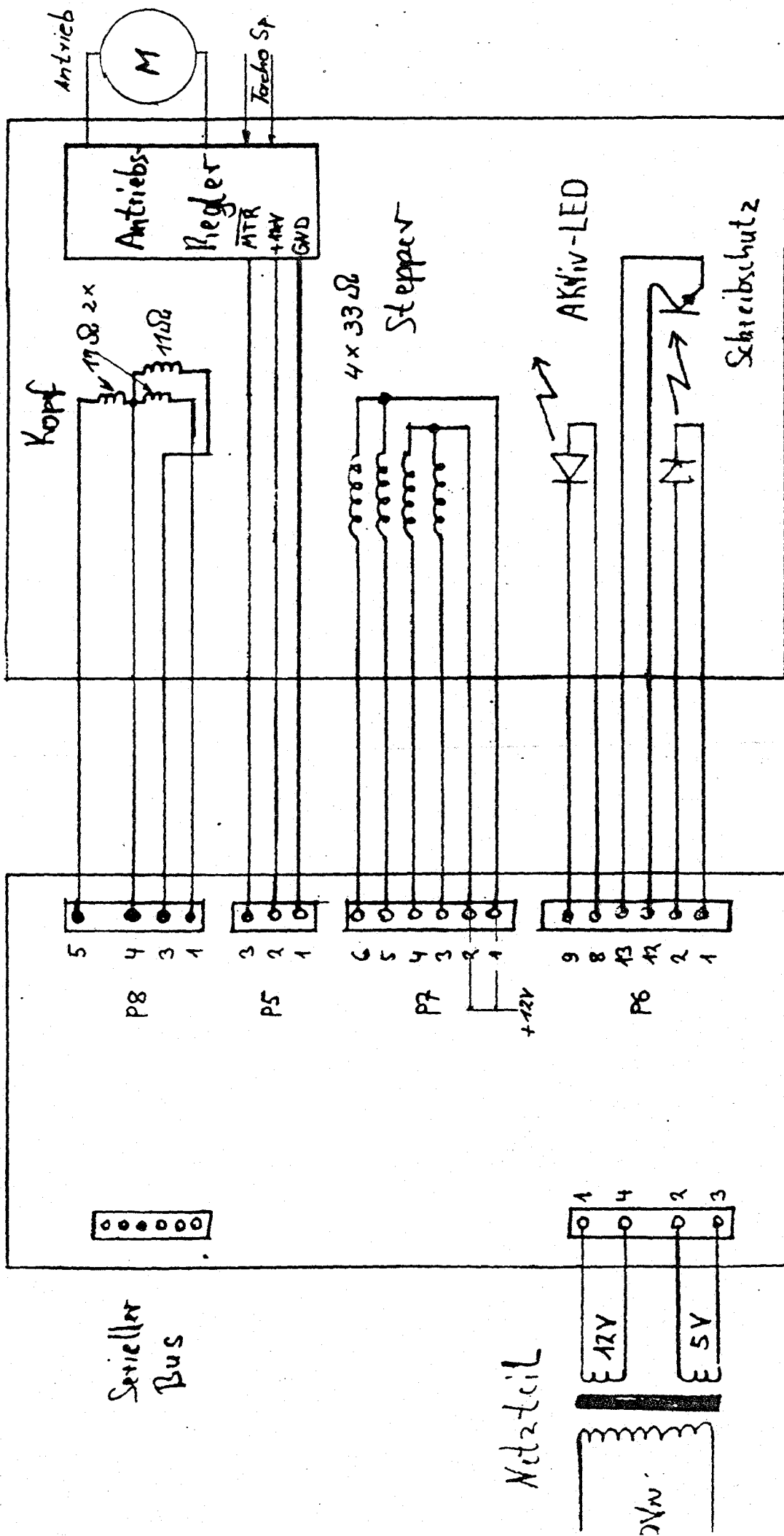


Symbol	Description	Symbol	Description
I.C.	CX-065B	R8	Resistor, 150Ω 1/4W
Q1	Transistor	R9	Resistor, 0.68Ω 2W
Q2	Transistor	R10	Resistor, 5.1KΩ 1/8W
Q3	Transistor	VR1	Variable Resistor, 20KΩ
Q4	Transistor	C1, 5, 6	Capacitor, 10μF 35V
CR1, 2, 3, 4, 5	Diode	C2	Capacitor, 0.0047μF 50V
R1, 7	Resistor, 1KΩ 1/4W	C3	Capacitor, 0.033μF 50V
R2	Resistor, 68KΩ 1/4W	C4, 9	Capacitor, 0.47μF 35V
R3	Resistor, 220Ω 1/4W	C7	Capacitor, 2.2μF 16V
R4	Resistor, 3.3KΩ 1/4W	C8	Capacitor, 0.068μF 50V
R5	Resistor, 2.7KΩ 1/4W		
R6	Resistor, 820Ω 1/4W		

1541

Leiterplatte

Laufwerk



Umbauvorschrift FLOPPY 1540/1541

Bei einigen Geräten vom Typ C64 trat ein Defekt an den Peripheriebausteinen auf, wenn nicht eine bestimmte Anschlußreihenfolge eingehalten wurde (erst Peripherie-Kabel, dann Netz-Kabel). (Siehe Seite 11 unten)

Ferner wurde der Datenbus zeitweise blockiert, wenn mehrere Peripheriegeräte gleichzeitig betrieben wurden (z.B. zwei Floppies oder Floppy und Drucker).

Die Ursache hierfür lag am RESET-Verhalten und am Betriebssystem der 1541 Floppy.

Um diese Mängel zu beseitigen gelten folgende Umbauvorschriften:

Seite 2 bis 4 : lange Platinenausführung
PCB No. 1540007 Rev.A bis Rev.E

Seite 5 bis 7 : kurze Platinenausführung
PCB No. 1540050 ab Rev.A

Folgende Testprogramme sind für die Floppy 1541 erhältlich:

970140.c	sfterr	Softerrortest	(C64)
970141.a	sfterr	Softerrortest	(VC20 mit 16 K)
970106.c	sfteff	Softerrortest mit Stoptest	(C64)
970150.a	fintst	Finaltest	(C64)
970127.a	alpadj	ALPS Drive Adjustment	(C64)
ary-03		Stop Adjustment	(C64 oder VC20)
f3-03		Finaltest mit	
		Kompatibilitätstest	(VC20 mit 3 K)
970140.cl5	sftary	für Tests nach dem Umbau	(C64)

commodore COMPUTER

S E R V I C E - I N F O

1) Zeitkonstante UG3 :

	<u>Original</u>	<u>ersetzen durch</u>
R 26	2,2 kOhm	5,1 kOhm
C 33	150 pF	33 pF

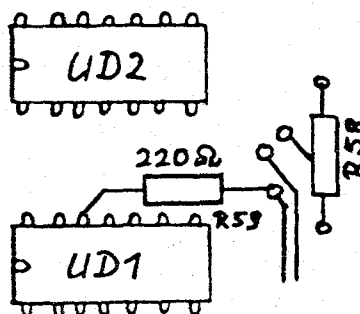
2) RESET - Schaltkreis :

	<u>Original</u>	<u>ersetzen durch</u>
R 43	100 kOhm	6,8 kOhm
R 59	nicht vorhanden	220 Ohm

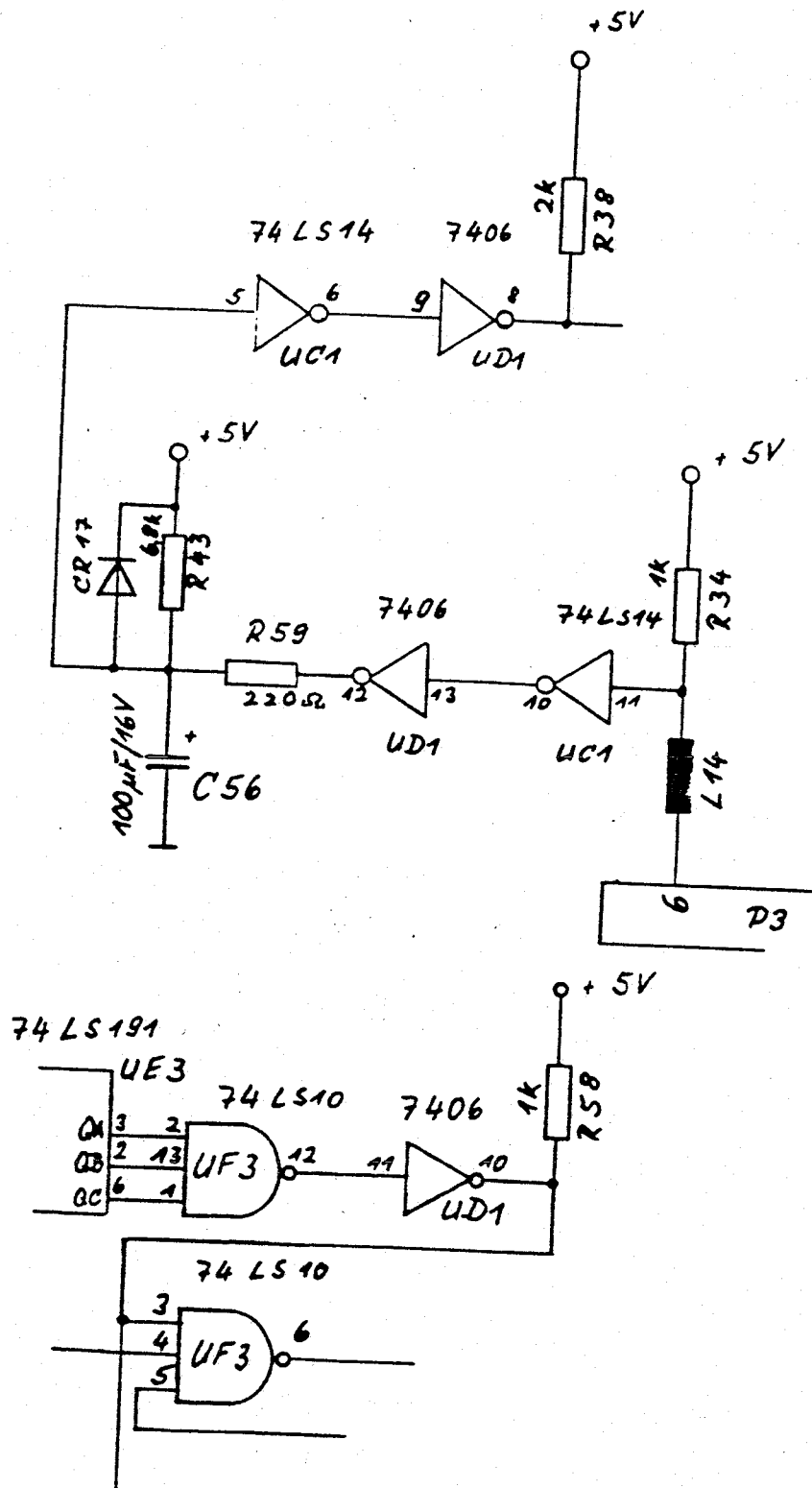
3) DOS - Rom :

	<u>Original</u>	<u>ersetzen durch</u>
UAB 5	901229-03 (1541) }	901229-05 AE } EPROM mit
oder	325303-01 (1540) }	oder 901229-06 AA } Adapter
	bzw. 901229-05	ROM

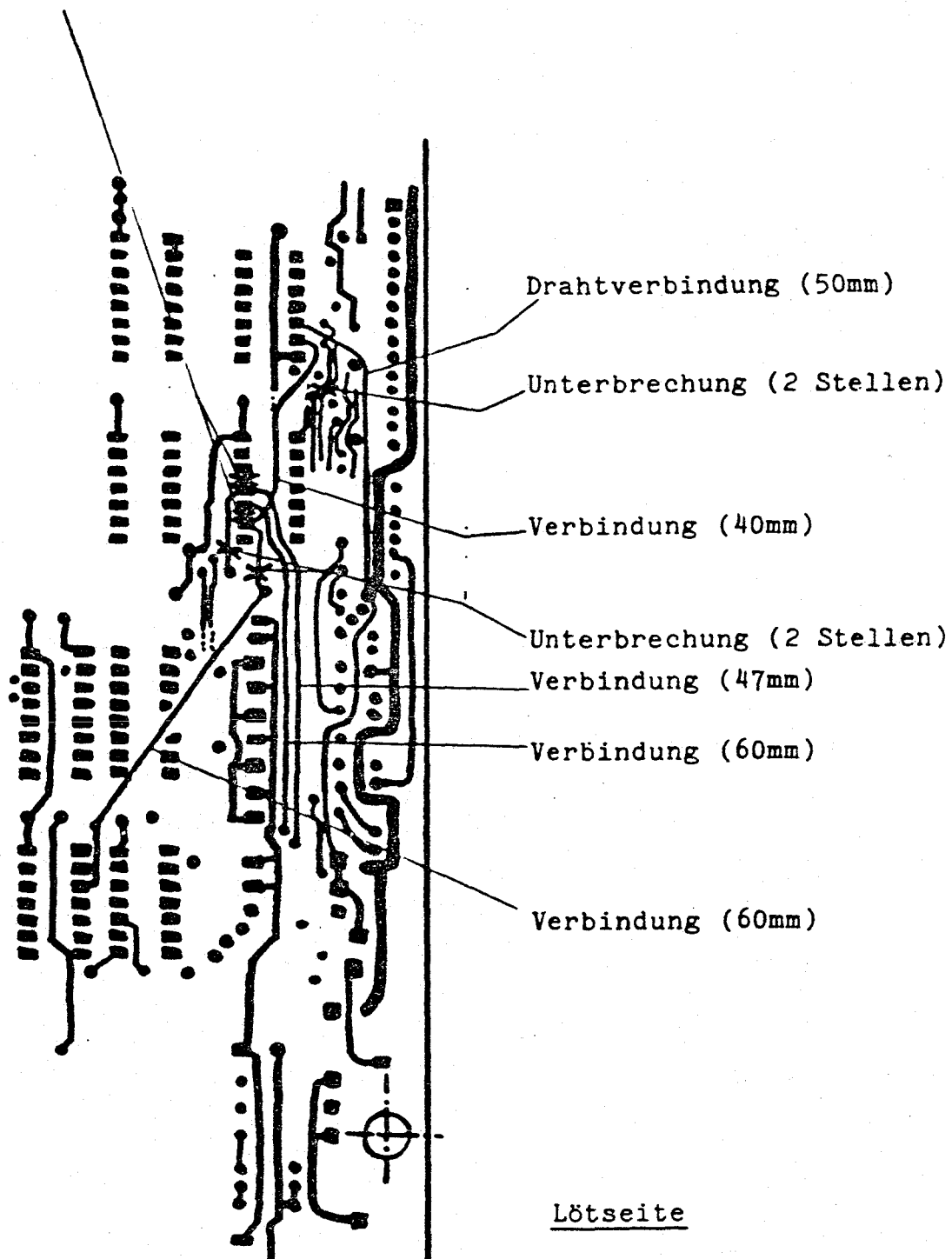
4) Einbauhinweis zu R 59 :



Der neue RESET - Schaltkreis :



Leiterbahnunterbrechung (2 Stellen)



1) Zeitkonstante UD4 :

	<u>Original</u>	<u>ersetzen durch</u>
R 11	2,2 kOhm	5,1 kOhm
C 31	150 pF	33 pF

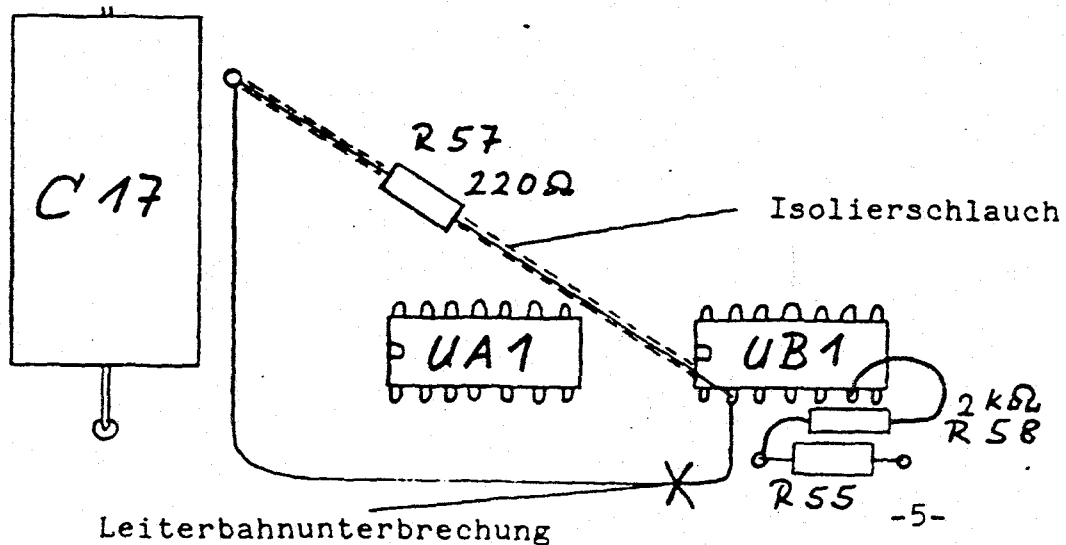
2) RESET - Schaltkreis :

	<u>Original</u>	<u>ersetzen durch</u>
R 25	100 kOhm	6,8 kOhm
R 57	nicht vorhanden	220 Ohm
R 58	nicht vorhanden	2 kOhm

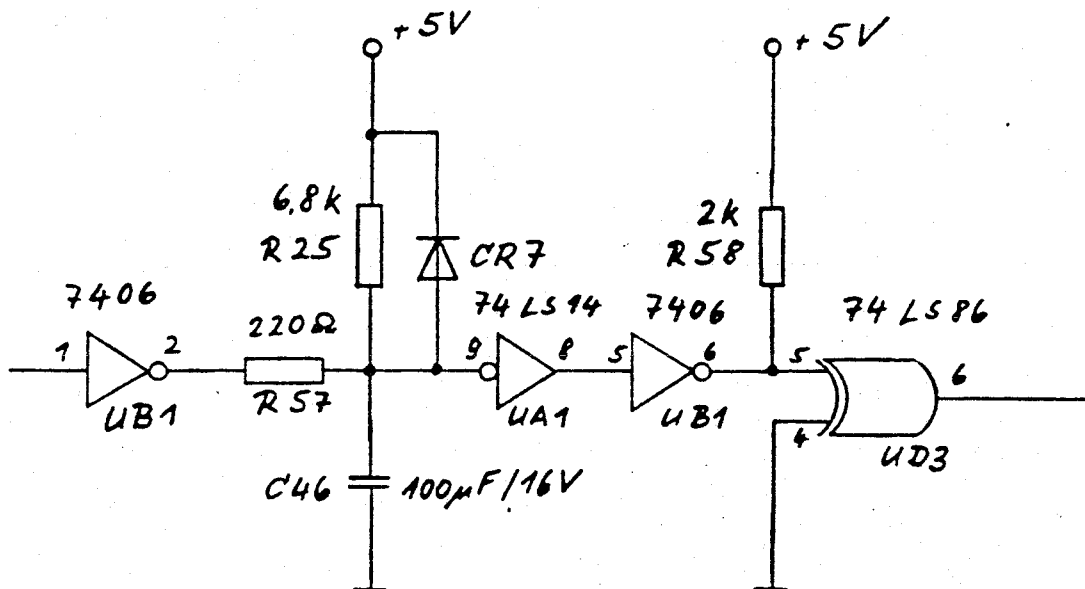
3) DOS - Rom :

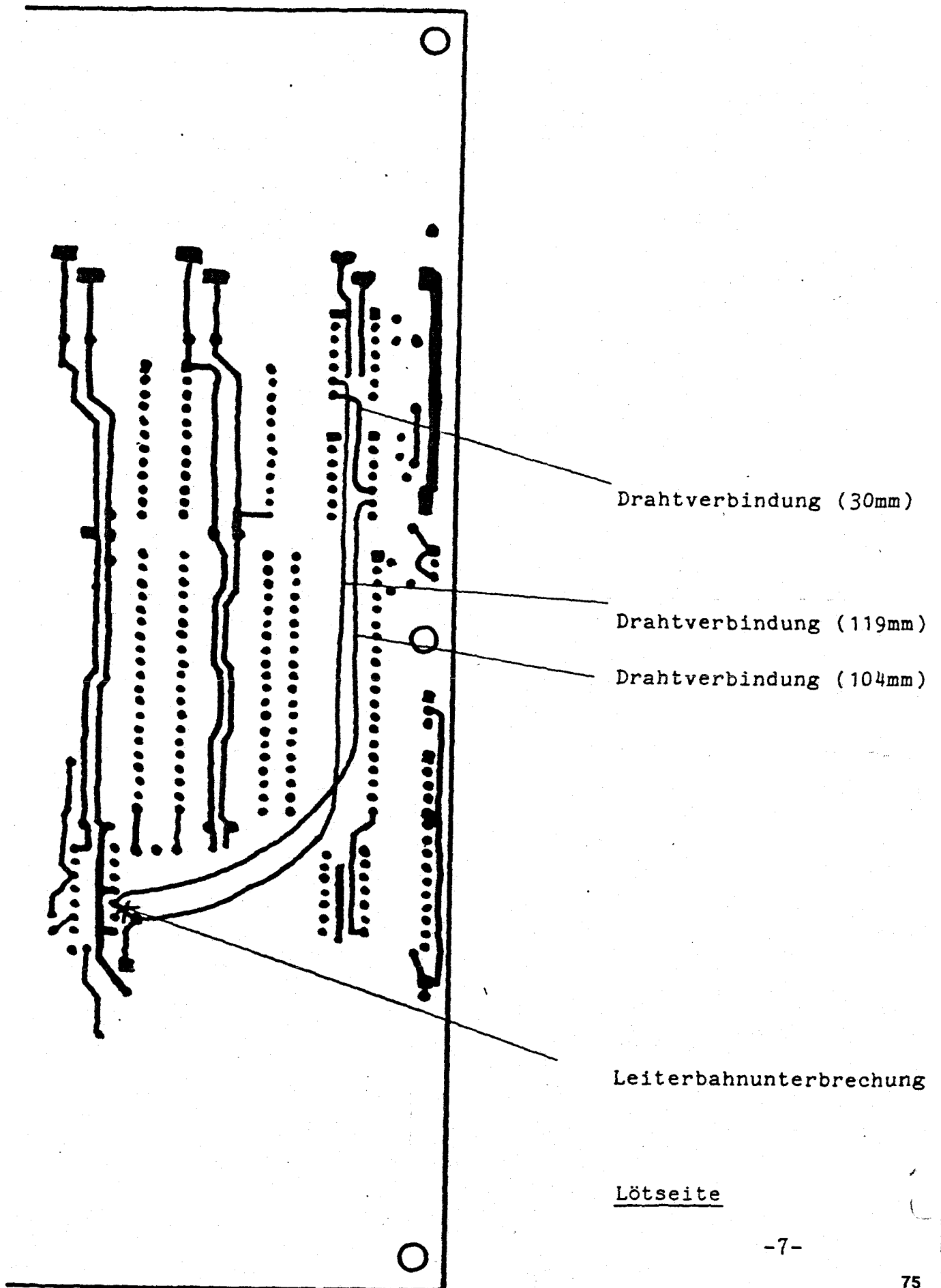
	<u>Original</u>	<u>ersetzen durch</u>
UB 4	901229-03	901229-05 AE EPROM mit oder 901229-06 AA Adapter bzw. 901229-05 ROM

4) Einbauhinweis zu R 57 und R58 :



Der neue RESET - Schaltkreis :







S E R V I C E - I N F O

Hinweis zum DOS:

Durch ein Versehen wurde in einige umgebaute Floppies 1541 ein EPROM 2764 mit der Bezeichnung 901229-05 Ae eingesetzt. Dieses hat die gleichen Fehler wie das ROM 901229-03 und muß wie unter Punkt 3 beschrieben ausgetauscht werden.

Die Version 901229-05 AE hat noch einen Fehler, der jedoch nur durch Abbruch des Formatierens (z.B. durch Öffnen der Laufwerksklappe) auftritt: Beim nächsten Formatierungsversuch fehlen die ersten Spuren, ohne daß eine Fehlermeldung erscheint. Nach einem solchen Abbruch sollte deshalb die Floppy aus- und wieder eingeschaltet oder folgende Zeile vor dem nächsten Formatierbefehl abgeschickt werden:

```
OPEN1,8,15:PRINT#1,"M-W"CHR$(81)CHR$(0)CHR$(1)CHR$(255):CLOSE1
```

Laufwerk

Das Laufwerk wurde geändert, um das Verstellen von Stopeinstellung und Alignment bei Erwärmung zu verhindern.

Außerdem wurde der Luftspalt der Stopeinstellung vergrößert. Die neuen Laufwerke sind wie folgt gekennzeichnet:

A) Seriennummer > 00938841 oder

B) Markierung (grüner Strich) auf der Oberseite des Laufwerks neben dem Befestigungspunkt für die Spiralfeder!

Interfacestecker

Sollte der Interfacestecker schwergängig sein, kann dies durch folgende Handgriffe korrigiert werden:

- Die sechs Befestigungsschrauben des Chassis im Boden lockern.
- Befestigungsschrauben festziehen.
- Falls erforderlich, Deckel vor dem Festziehen nach rechts drücken.

Tests nach dem Umbau

Stopring:

Für die Kontrolle und Justage der Stopeinstellung dienten folgende Programme:

Alte Laufwerke (0,25 mm Luftspalt): 970127 (Step 6)

Neue Laufwerke (0,35 mm Luftspalt): ARY-Ø3 (Stop Limit Test)

Justage: Die Stopeinstellung ist grundsätzlich mit dem Testprogramm ARY-Ø3 zu testen und evtl. zu justieren (auf 0.35 mm Luftspalt). Nach der Justage Schraube mit Lack sichern.

Track-1-Test: Mit dem Testschritt S des Testprogramms 970106.C ist die Stopeinstellung zu überprüfen. Dazu muß eine Track-1-Diskette verwendet werden.

Track-1-Diskette: Diese Diskette erzeugt man durch folgendes Verfahren:

- Physikalisches Löschen einer Diskette im äußeren Bereich (z.B. mit kräftigem Permanentmagnet, Löschung mit Oszilloskop am Leseverstärker überprüfen!).
- Formatieren von Spur 1. Dies sollte mit einem im Alignmet kontrollierten Drive erfolgen.
(Kommando: open1,8,15,"nØ:x,ØØ)
Sofort nachdem der Schreib-/Lesekopf auf Spur 2 positioniert hat, ist die Laufwerksklappe zu öffnen.

S E R V I C E - I N F O

Softerrortest: 2 Passes mit Programm 970140.C, in dem Zeile 1080 geändert wurde: NP=002

Starten des Programms mit RETURN

Testdauer: 8 min.

Am Ende muß die rote LED 1 x blinken = OK.

2 x blinken = zu viele Fehler im 1. Pass

3 x blinken = kein Zugriff zur LOG-Datei

4 x blinken = Abbruch beim Formatieren

Nach Aus- und Einschalten der Floppy mit 0 die LOG-Datei auslesen.

Es muß erscheinen:

Summary of Drive 0

Number of Passes: 2

Total Errors = 0

Countable Errors = 0

HINWEIS: Um Ausfälle infolge von Zentrierfehlern zu vermeiden, sollte die Laufwerkssklappe langsam während des Drehens geschlossen werden (z.B. unmittelbar nach dem Einschalten der Floppy).

Da der Antriebsriemen bei Kälte schlecht haftet, sollte die Floppy vor dem Test Raumtemperatur haben.

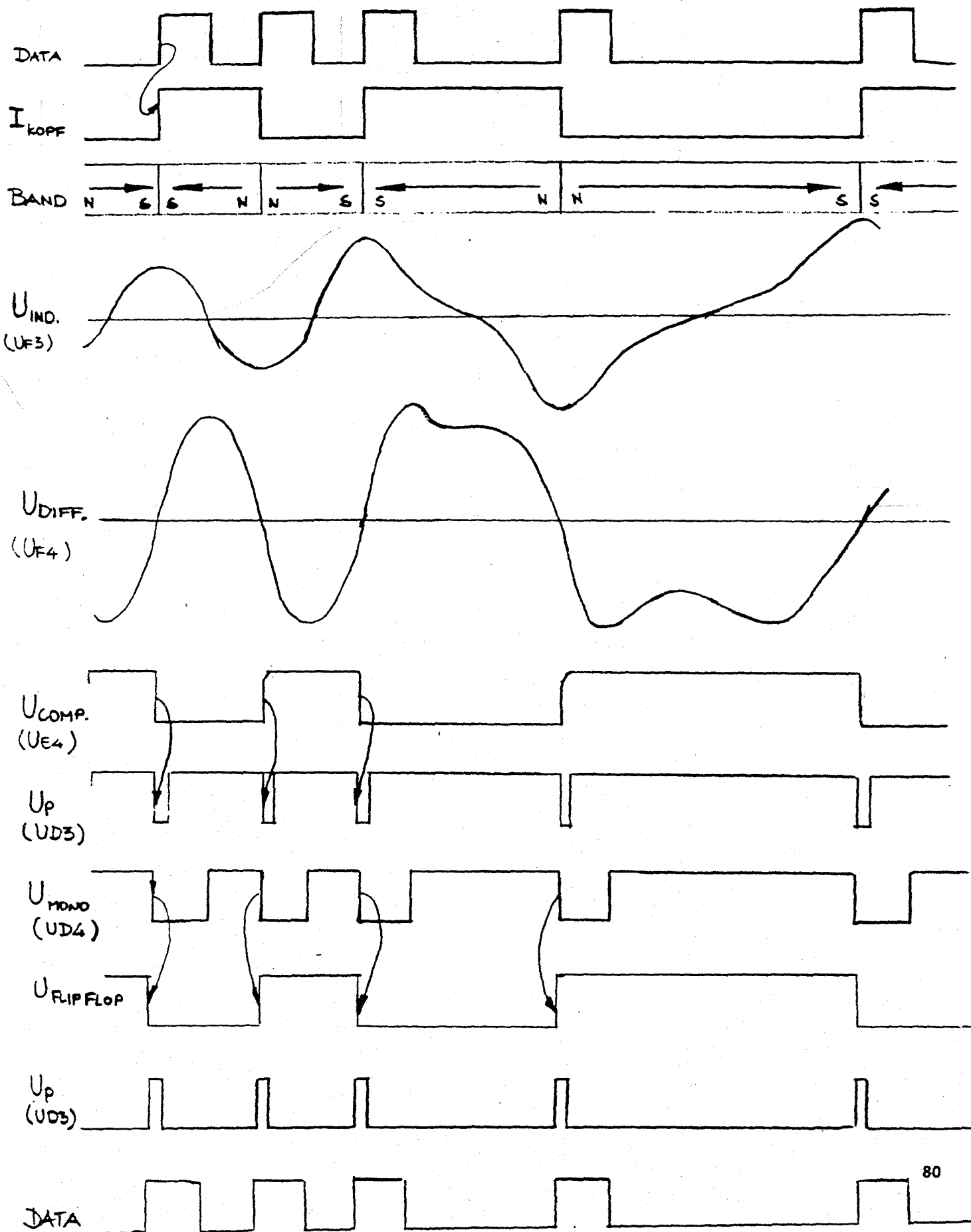
Für die Kontrolle des Alignments dient das Programm 970127(STEP 5: Alignment Test). Als Alignmentdiskette läßt sich auch eine 8050/8250 Alignmentdiskette verwenden, wenn auf das Sync-Signal zum Triggern des Oszilloskops verzichtet wird.

ACHTUNG: Der C64 und die anzuschließenden Fernseher entsprechen der Schutzklasse 2, während die Floppy 1541 mit dem Chassis auf Erde liegt. Dadurch kann der Portbaustein 6526 (U2) im C64 bei häufigem Verbinden und Trennen des Interfacesteckers (z.B. beim Softerrortest) zerstört werden. Um dies zu vermeiden, ist die Masse des C64 auf Erde zu legen (z.B. über das Halteblech am Cartridge-Stecker) oder Schutzdioden in den C64 einzulöten (siehe Bild S. 12).

SIGNALVERLAUF DER DATEN

1541

(ANALOG - TEIL)



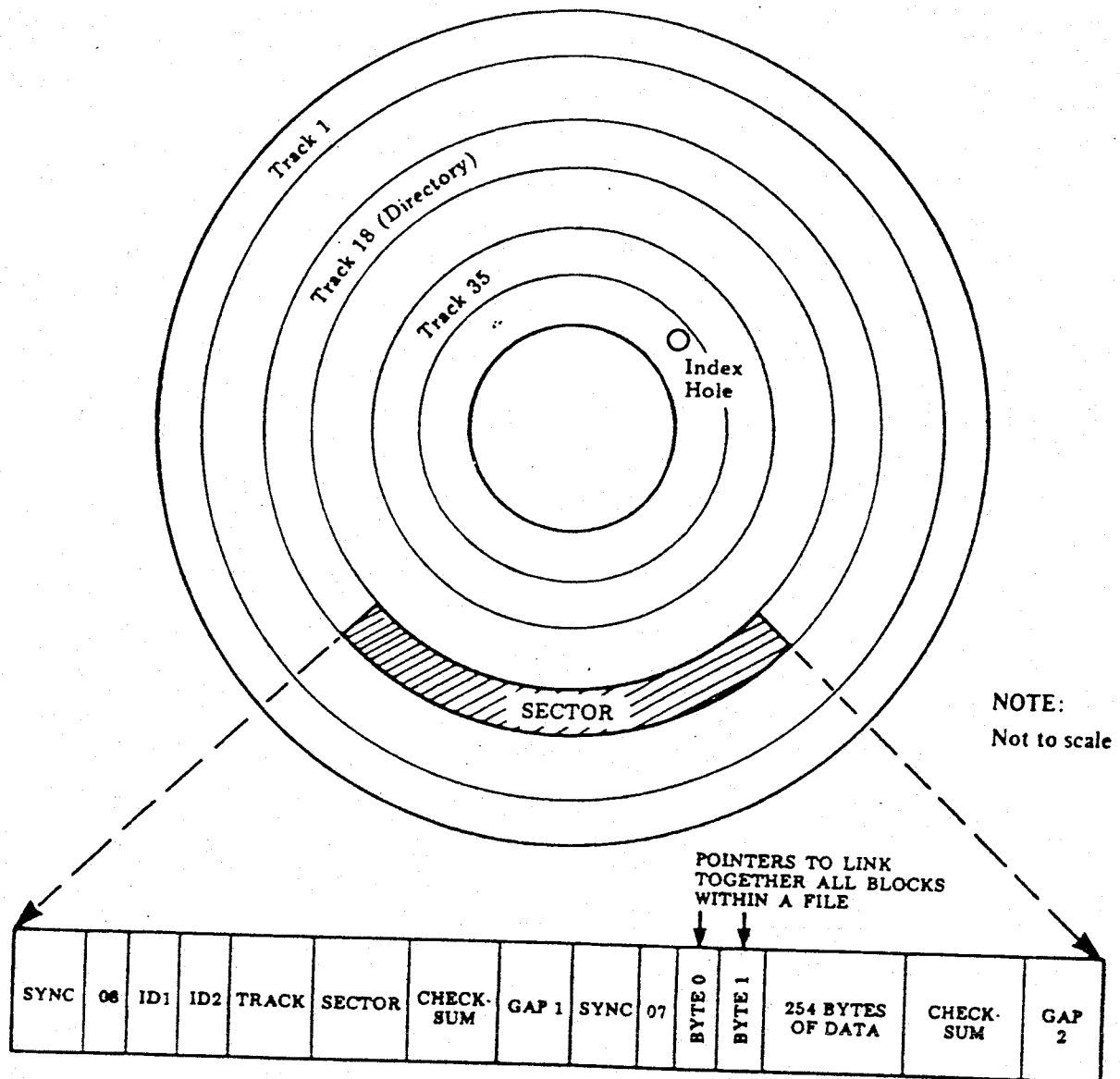


Table 6. Block Distribution By Track

2040, 3040 Track number	Block or Sector Range	Total
1 to 17	0 to 20	21
18 to 24	0 to 19	20
25 to 30	0 to 17	18
31 to 35	0 to 16	17
4040 Track number	Block or Sector Range	Total
1 to 17	0 to 20	21
18 to 24	0 to 18	19
25 to 30	0 to 17	18
31 to 35	0 to 16	17
8050 Track number	Block or Sector Range	Total
1 to 39	0 to 28	29
40 to 53	0 to 26	27
54 to 64	0 to 24	25
65 to 77	0 to 22	23

S E R V I C E - I N F O R M A T I O N

Betr.: PCB-ASSY 250442 und 250446

CBM 1541

Motoranlauf beim Einlegen der Diskette

Bedeutung der Jumper J1 bis J7

BSW, 09.11.84

Auf den oben angegebenen Leiterplatten befinden sich nicht bestückte Bauteilepositionen. Nach der Bestückung folgender Positionen bewirkt ein von der Schreibschutzlichtschranke erzeugtes Signal, daß der Antriebsmotor beim Einlegen einer Diskette ca. 6 Sekunden lang dreht. Dadurch ist ein besseres Zentrieren der Diskette gewährleistet, wenn die Laufwerksklappe innerhalb dieser Zeit geschlossen wird.

Position	Bauteil	Kommentar
UA2	NE555	Timer
R58	1.5k	Widerstand
R60	510k	Widerstand
C49	10uF/25V	Elko
C50	22nF/50V	Kondensator
C52	22nF/50V	Kondensator
CR19	1n4148	Diode
J3		geschlossen
J4		offen
J7		offen

Die Jumper J1, J2 und J5 sollten nicht nachträglich verändert werden, sie sind normalerweise geschlossen. Falls die Positionen UA3 und UC5 bestückt sind, sind J2 und J5 offen.

Der Jumper J6 paßt den Schreibstrom an den jeweiligen Laufwerkstyp an.

Laufwerk	ALPS	NEWTRONICS
J6	offen	geschlossen

Die gültigen Schaltunterlagen haben folgende Nummern:

251748 Rev.E (1541A, PCB-ASSY 250442, PCB-Nr.251777, UD4=9602)

251834 Rev.C (1541A-2, PCB-ASSY 250446, PCB-Nr.251830, UD4=74LS123)

MIT ALPS LAUFWERKEN

Mit C - 64

"970106.c	sfterr"	Schreib/Lese Dauertest + Geschwindigkeitstest + Stopkragen-Einstellung + Blinktest
"970127.a	alpadj"	Laufwerk Justage Alignment
"970150.a	fintst"	Ausdruck des sfterrtest
"970140.c	sfterr"	Schreib/Lese Dauertest + Geschwindigkeit
"970140.c15 sftary"		Schreib/Lese Dauertest(2Läufe) +Stopkragen Justage +Spur 1 Test
"Einstellprogramm"		Laufwerk-Justage Alignment

Mit VC - 20

"970141.a	sfterr"	Schreib/Lese Dauertest nur mit 16 K Erweiterung
"ary - 03"		Stopkragen Justage C 64 + VC 20
"f3 - 03"		Stopkragen Justage + LED Kontrolle + Schreib/Lesetest (Kompatibilität) nur mit 3K Erweiterung

1540 Drive Einstellung

Die Kopf-Einstellung für die VC-1540 Floppy wird in der gleichen Weise durchgeführt, wie die Einstellung der CBM 4040 Drives. Z.B.: Der Stepper wird positioniert auf die Alignmentspur (17) und der Kopf ist dann richtig justiert, wenn beide Amplituden gleich groß sind (cat eye's).

A. Die folgenden Teile werden benötigt:

- a. eine Commodore 2040-3040-4040 Alignment Diskette
- b. eine formatierte Diskette
- c. das VC-1540 Einstell Programm
- d. einen Kreuzschlitz- und einen Flach-Schraubenzieher
- e. ein 1-Strahl Oszilloscope mit externer Triggerung

B. Laden sie das VC-1540 Einstellprogramm

- C. 1. entfernen Sie die beiden Plastikschaalen des Gehäuses der Floppy
2. lösen Sie die Platine vom Metallgehäuse

D. Stellen Sie ihr Oszilloscope ein auf folgende Werte:

Kanal1
externe Triggerung
20mV/cm
20ms/cm

Messung mit dem Tastkopf an UH5 Pin1 oder 14. Externe Triggerung auf UC2 Pin 9

E. Starten Sie das Programm, so daß Sie die Befehlsübersicht erhalten. Legen Sie die Alignment-Diskette in die Floppy ein.

Befehlsübersicht:

- i - Eine Spur nach innen
- a - Eine Spur nach aussen
- b - Kopf fährt zum Anschlag und positioniert auf Spur 17 (Alignment Spur)
- h - Testet ob nach einem Spurwechsel der Kopf wieder exakt auf die Alignment Spur (17) zurück fährt.(Hysteresestep)
- e - Einstellung der Spur 1 auf 0.25mm Abstand des Stepermotors zum Anschlag
- t - Testet ob eine formatierte Diskette beschrieben und gelesen werden kann

F. Alignment Einstellung

Die Alignment Einstellung ist dann ok wenn nach bump sound und Hysteresestep die cat eye's eine kleinstmögliche Abweichung in der Amplitude (maximal 20%) voneinander aufweisen.

Ist dies nicht der Fall, so muß der Steppermotor verdreht werden, bis die Amplitudendifferenz im Toleranzbereich liegt. Um den Steppermotor zu bewegen lösen Sie die beiden Schrauben auf der Unterseite der Floppy. Sind die cat eye's nicht zu sehen, so muß der Steppermotor durch Eintippen von 'i' oder 'a' nach innen oder nach außen gedreht werden, um so die Alignment-Spur zu finden.

Durch Eintippen von 'b' (bump sound) wird erneut versucht, nach verfahren des Kopfes zum Endanschlag, die Alignment-Spur zu finden.

Durch Eintippen von 'h' (Hysterese) erfolgt ein Hysterese-Step.

Nach jedem dieser beiden Verfahren muß die Toleranz der Amplitude kleiner als 20% sein.

Nun schrauben Sie den Steppermotor wieder fest; danach muß die Einstellung ein weiteres Mal überprüft und gegebenenfalls korrigiert werden.

G. Endanschlag-Enstellung

Um den Endanschlag einzustellen drücken Sie die Taste 'e' (Endanschlag). Dann fährt der Kopf von Spur 17 auf Spur 1. Nun sollte zwischen dem Endanschlagswinkel und der Anschlagscheibe des Steppermotors 0.25mm Platz sein.

H. Motorgeschwindigkeitseinstellung

Auf der Unterseite der Floppy befindet sich eine Bohrung an der man das Potentiometer VR1 verdrehen kann um die Motorgeschwindigkeit einzustellen. Die richtige Drehzahl ist erreicht wenn man auf der Stroposkopescheibe ein stehendes Bild sieht.

I. Lese und Schreibtest

Legen Sie eine formatierte Diskette ein. Die Diskette wird neu formatiert und danach wird versucht auf jeder 2. Spur zu schreiben und zu lesen. Treten keine Fehler auf so ist die Floppy richtig eingestellt.

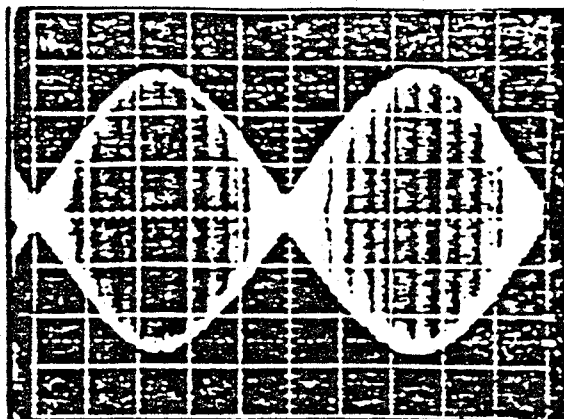
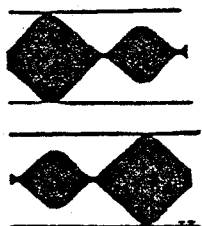


Bild 1 : Optimal eingestellte cat eye's

schlecht eingestelltes Laufwerk



muß nachjustiert werden

muß nachjustiert werden

gut eingestelltes Laufwerk



optimale Einstellung

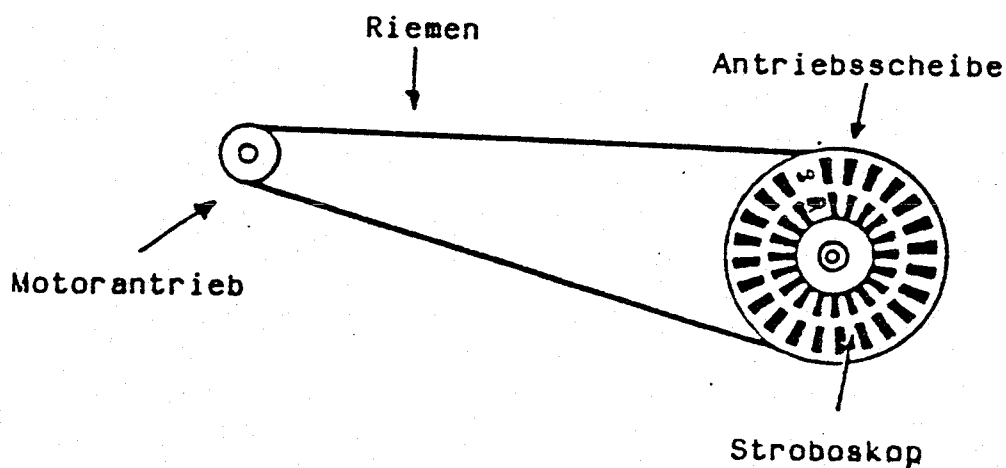
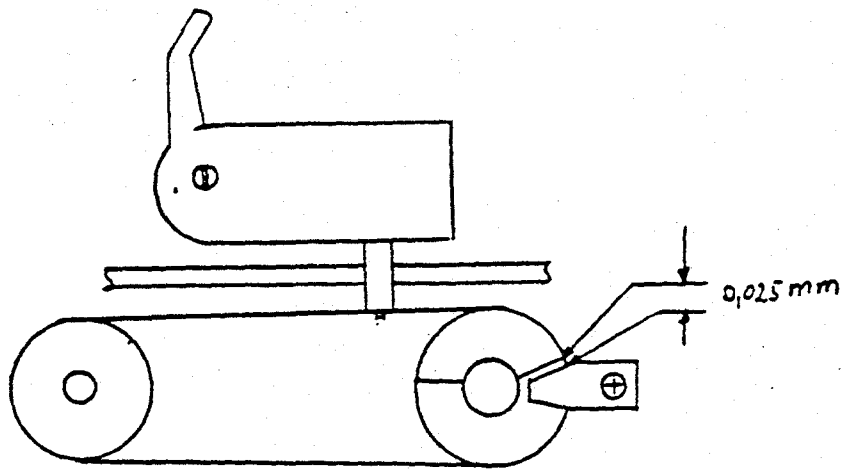


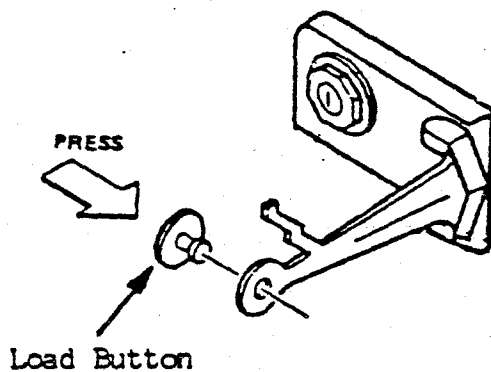
Bild 2 : Stroboskopescheibe und Antrieb



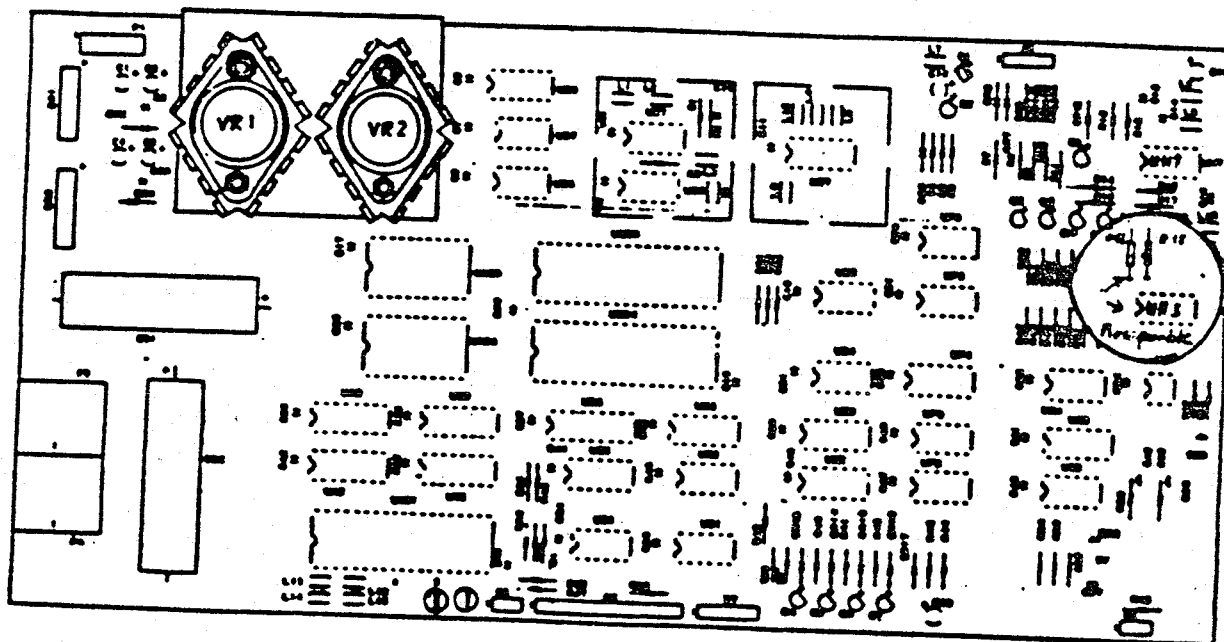
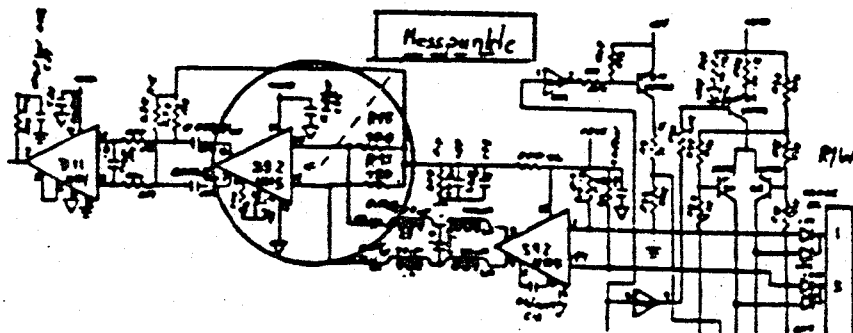
R/W Kopf

Endanschlagswinkel
Anschlagsscheibe

Bild 4: zu Punkt G

J. Austausch des Andruckfilzes

Bei Abnutzung oder Vibration (der Drive "singt") muß der Andruckfilz ausgetauscht werden. Mit der Zange wird die Halteklammer des Andruckfilzes zusammengedrückt und herausgezogen. Der neue Andruckfilz wird nur in die Halterung gedrückt.

K. Messpunkte für die Alignmenteinstellung

REVISIONS				
LTR	ZONE	DESCRIPTION	DATE	APPROVED
		SEE SHEET 1		

12. HEAD ALIGNMENT (PERFORMED AT TR.16)

	TESTED AT FACTORY	FIELD
RADIAL	80 %	60 %
HYSTERESIS	80 %	60 %

ALIGNMENT STANDARD

DYMEK ALIGNMENT DISKETTE DK501-2

CE ALIGNMENT TRACK AT 1.9167 ± 0.0003 INCHES

13. AZIMUTH (PERFORMED AT TRACK 34) $\pm 12'$ MAX.

ALIGNMENT DISKETTE DK501-2

CE ALIGNMENT TRACK AT 1.5417 ± 0.002 INCHES

14. DOOR LEVER TORQUE

14-1 OPENING TORQUE 0.4 - 1.4 kg·CM

14-2 CLOSING TORQUE 0.25 - 0.75 kg·CM

15. DRIVE MOTOR INTERFACE

SIGNAL LEVEL TTL

FAN IN 5

LOGICAL LEVEL MOTOR

H OFF

L ON

16. STEPPING MOTOR DRIVE SEQUENCE

PHASE.	ORG.	BRW.	YEL.	BLK.	
NO. 1	ON				TR. 2
NO. 2		ON			
NO. 3			ON		TR. 1
NO. 4				ON	
NO. 1	ON				TR. 0

* RED ; COMMON

17. SHOCK TEST

OPERATING 0.5 G MAX.(2-50HZ)

NON OPERATING OR STORAGE CONTINUOUS 5 G MAX.

SINGLE 25 G MAX.

UNLESS OTHERWISE SPECIFIED TOLERANCES ON: DECIMALS .X .XX .XXX .S	DRAWN BY:	DATE	commodore FLOPPY DISK NEWTRONICS		
	N. Hanamura	1-10-84			
	CHKD: J. On	3/13/84			
	ENGR: S. Takahashi	3-14-84			
MATERIAL:		USED ON	NEXT ASSY	SIZE	REV
FINISH:				B	B
				SCALE NONE SHEET 2 OF 5	